40p EVERY WEEK • No 99 • FEB 16 1985

PERSONAL Computer NEWS

COMMODORE CUTS PRICES - P.2

WHY ACORN CRACKED

WHAT CAUSED THE CRISIS

64 SLEUTH
Star adventures for your Commodore

SPECTRUM SPRITES
Amazing graphics utility-free

TANDY vs IBM
Full review of the Tandy 1000

GAMES LATEST
New plays for 64, Amstrad & Spectrum

SPECTRUM DISKS

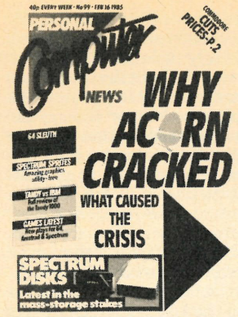
Latest in the mass-storage stakes

MENU

COVER STORY

Acorn adrift

Britain's number two home micro maker is in deep trouble. What brought Acorn to the brink, and where does it go from here? What difference will the crisis at Acorn make to BBC and Electron owners? We untangle the strands to put you in the picture.



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It's goodbye from us . . . but we, at least, shall be back next week.

MONITOR

Acorn searches for way out of crisis

The future of Acorn hangs in the balance this week. The storm that threatened to sink the company a week ago shows no sign of blowing over, and the chances of Acorn emerging intact look bleak.

As *PCN* went to press, Acorn was sheltering behind a wall of silence. Its official statement, that the company was reorganising its finances, only served to intensify the rumours sweeping the industry.

But suppliers, stockbrokers, users and associates were all holding their breath. The BBC, Acorn's mainstay over the last three years, seemed as confused as anybody at the speed with which Acorn had been plunged into crisis.

Matters came to a head last Wednesday (February 6) when the company's share price dipped to 23p before trading in the stock was suspended. It transpired that Acorn had changed its bankers, moving from Lazard Brothers to the less well-known Close Brothers, and that its broker, Cazenove, had resigned.

That points to a serious disagreement over financial policy, since a company's banker is also its financial advisor. City stockbrokers expect Acorn to show a loss in its year's business up to June 1985, after years of consistent growth, and confidence in the company evaporated as the share price tumbled.

The crisis appears to have struck Acorn half-way through a reorganisation. It trimmed the number of distributors from 17 to six last week and was understood to be on the point of cutting its workforce by about seven per cent. It may now be forced into even greater cuts.

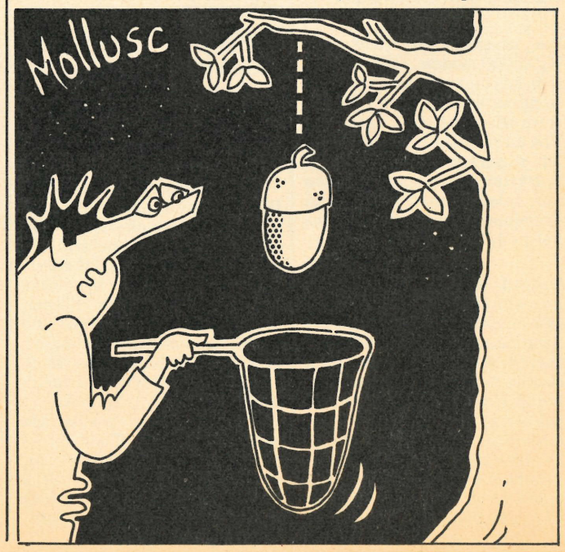
The vast numbers of BBC Micros sold, coupled with the well-developed support industry that has grown around the machine, could make Acorn (or part of it) an attractive proposition as the object of a takeover bid. But the rumours that GEC and Thorn-EMI are about to step in with a cheque book can be discounted.

Even if the company's future is taken out of its hands, users of BBCs and Electrons should be able to count on continued support. The BBC Micro alone supports a number of independent maintenance organisations.

Torch, which pulled out of a proposed merger with Acorn just days before the storm broke, affirmed that it would 'continue to supply BBC add-ons while there is a demand for them,' and this was also the attitude of other third-party suppliers. Torch is understood to be licensed to produce BBC Micros if Acorn becomes unable to deliver them.

Meanwhile Acorn's efforts to re-construct are likely to be hampered by a credibility gap that grows wider as the company's silence lengthens. To add to its problems, it may be asked why it gave no formal notice last week that it had parted company with its banker.

● See Home Front, page 4, for analysis of Acorn's problems.



IN BRIEF

Stricken Prism was quiet last week, but no news isn't good news for the former micro distributor. A spokesman for the official receiver who is examining the company's prospects said that there had been no developments during the week. The aim is still to keep the group trading and to negotiate the sale of some of its divisions.

Amstrad has collected another feather to put in its cap with WH Smith's decision to stock the CPC 464 at 50 of its stores. Don't look in Smith's computer departments or business computer centres — the Amstrads will be on sale in separate Computer Shops within certain stores.

Tandy and ACT made their joint contribution to the retail scene last week by kicking off AT Computerworld, which will operate 18 former Tandy shops and 20 ACT outlets. But the planned expansion into Europe has been pushed into the background. The operation will concentrate on the UK, where ACT will also supply machines to those other UK Tandy stores that have business computer departments.

3D animation is promised by Bubble Bus Software (0732-355962) for its first stab at an Amstrad program. Called Hi-Rise, the game features a number of ladders and catwalk screens, each of which can viewed from four different angles. Hi-Rise (costing £6.99) is due to be released in April, with versions for other machines soon afterwards.

The company that built the VTX5000 modem, OEL of Penrith, has launched an adaptor to coincide with a new telesoftware service from Channel 4. The £125 4-Data adaptor will let owners of Spectrum and Spectrum Plus machines tap into teletext information and download software from Channel 4's 4-Tel service.

Amstrad has snuffed out any hopes of a price-cut to the CPC 464 but its managing director Alan Sugar last week held out the prospect of cheaper disk storage this year. The company is refusing to be drawn into a price war. 'We're not reducing our prices, said Sugar firmly. He also nailed the reports that Amstrad would launch a new machine at the LET show at Olympia this week — but you won't have much longer to wait.

Plus/4 at half mast as CBM swings axe

The axe has fallen on the Commodore Plus/4. So far £150 has been trimmed off the price, but the machine's career could be in the axe's path as well.

After weeks of denying that it had any plans to reduce prices Commodore took the Plus/4 down to £150 earlier this week. This is savagery on an unprecedented scale — the Plus /4 was launched last year at £299. A spokesman said sheepishly that the cut was not a short-term special offer.

The Plus/4 was aimed to bridge the gap between home and business computing. It has 64K of RAM, 32K of ROM, a Basic with more than 75 commands, and four applications packages — a word processor, database, spreadsheet and graphics — in ROM.

But the system was received half-heartedly by some independent software suppliers, and it began to look distinctly superfluous when the Commodore 128 made its appearance at the Consumer Electronics Show in Las Vegas (issue 95).

Two weeks ago (issue 98) Commodore was forced to declare redundancies at its Corby plant, where the Plus/4, the Commodore 16, and the 64 are built. This news was followed by reports from the US that Commodore had cut the price of the 64 to $150 there. The UK company said that the 64 in this country would not follow suit.

Commodore is presenting the Plus/4 cut as an example of its ability to assess and react rapidly to changing market circumstances — in other words, it's kicking the BBC micro while Acorn is down. Other companies may have to respond.

Vive Oric! French move in with bid

Following its sudden death the week before last, Oric Products International looks as if it may be heading for reincarnation in France.

The company's receiver, Dennis Cross, has so far had three definite offers for the company from Europe, and last week had 'a very useful meeting' with a French syndicate that includes Oric's French distributor, ASN. The deal this syndicate was offering wasn't acceptable to Mr Cross, but he was expecting a revised offer by the beginning of this week.

If this offer is acceptable Oric will follow Dragon Data across the Channel. It is, however, early days for identifying a latin penchant for buying secondhand UK micro manufacturers . . .

As far as offers from the UK are concerned, matters look decidedly thinner. The management buy out that was being touted immediately prior to the crash now seems flimsy. Mr Cross concedes that 'people keep talking about a management buyout', but points out that no-one is talking to him about it. He has, however, received one offer from an ex-director of Oric, although he wouldn't say which.

In default of serious offers from the UK it therefore looks as if Oric is bound for the continent, where things have always looked rosier for the company. Mr Cross says a deal where the Oric would be manufactured in France under licence is a possibility. The company didn't have nearly as good a Christmas in France as it had expected, but a showing of the Oric Stratos at the Frankfurt fair (part of it while Oric was actually in receivership) generated considerable interest.

As far as existing users are concerned, things don't look too hopeful. If a British company bought Oric there would be some chance of support for Oric 1 and Atmos owners, but if a French company picked it up, in default of a Jacobite-style return some unspecified time in the future, UK users could well find themselves organising software buying expeditions to Boulogne . . .

Atari puts 800XL in to cut-price packs

It's death by 1,000 cuts at Atari as the company clears the decks to make room for its new lines.

Dealers are still expecting the XE and ST ranges to arrive in the UK from April onwards, but it looks as though the stock of XLs will be sold off first. The cuts are being applied to the 800XL, but Atari has its competitors in mind for the chop.

Depreciation seems to start work on the 800XL before it even crosses the counter. The machine's price was virtually halved by Christmas last year, and two packages due to be put together this month effectively bring it down again.

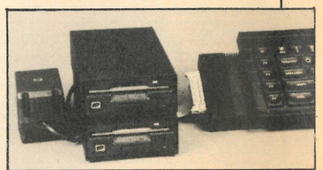
Its price at the moment is £129. The first package will give you an 800XL, 1050 disk drive, Home Filing Manager and a disk-based adventure for £249.99. The second puts together the 800XL, a 1010 recorder, and Pole Position for £129.99.

The 1010 cassette recorder sells separately for £34, and the 1050 drive for £199. If dealers start to split these packages the 800XL should cost no more than £90.

Basingstoke boost for QL disks

The steady trickle of QL disk drives we've been seeing over the past few months looks like building up to a flood.

Micro Peripherals (Basingstoke 473232) has announced a 720K 3.5in drive, while Medic Data Systems (Basingstoke — odd coincidence that — 475244) was scheduled to show a 1Mb 5.25in system at last Saturday's ZX Microfair.



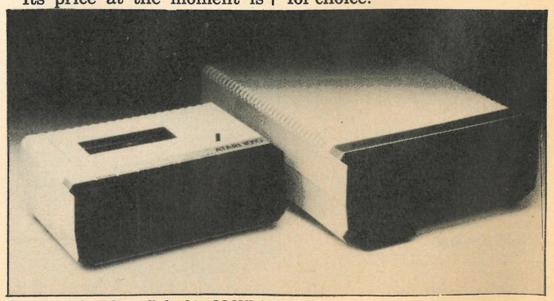
MP disks join QL flood.

Of the two the MDS sounds the more interesting. The system consists of interface with built-in Centronics port and 64K memory plus one drive, and costs £249.95, while a twin drive system will cost £399.95.

MDS also offers a slightly confusing number of extras, including modem, 512K memory expansion and ROM expansion. More details on these after we've pinned them down at the Microfair.

The Micro Peripherals system will support up to four drives, and the basic system of interface and single drive costs £331. Extra drives cost £183 apiece.

These two systems join disk units from Quest and CST in the QL accessories line. Any users disenchanted with Microdrives may now find themselves spoilt for choice.



Atari peripherals — linked to 800XL in bargain basement packages.

VIEW FROM THE US

Frankfurters go cold at old boy's reunion

In retrospect it was like a wake. Will the recent Frankfurt Computer Fair prove to be the last time Acorn, Oric and all the others were gathered under the same roof?

Over 170 exhibitors, including a large number of UK representatives, gathered together in a desperate, and, for the large part, futile attempt to rake in the deutschmarks.

You could sympathise with the German public, though. There wasn't really anything to fire the imagination at Frankfurt, despite enormous publicity given to the event. Amid a mass of PC compatibles only a few items of interest were there to tempt the end user. The Samurai/Elan/Flan/Enterprise made another bid for the most-named micro by emerging in German guise as the Mephisto, 'Der zukunftsorientierte Heimcomputer'. It is some indication of the state of affairs on the German market that this machine was seen as being possibly the most exciting exhibit at the show.

Acorn was putting a brave face on things. After nearly a year in business in West Germany it had only 12,000 sales. Attempts to launch the ABC series came to nothing when the only specimen arrived from the UK in little pieces. Meanwhile, the high price of the Beeb was causing difficulties. Although great hopes were held out for the Electron, Acorn's performance looked shaky beside Amstrad's, which is rumoured to have secured a sale of 40,000 machines under the prestigious Schneider label within weeks of its German debut.

Oric and Sinclair were making quite an impression on the locals. Oric launched the Stratos and the company's top brass was closeted with German retailers. 'Over 20,000 machines!' yelled a harrassed lackey, who was too busy keeping dealers in an orderly queue to make much sense.

Sinclair was not quite so buoyant but it looks like having the last laugh. Having secured the number two position in the home market behind Commodore, the company seems a little uncertain about where to go next. There's a modified German QL on the way, but, as European Operations manager Richard Horovitz pointed out: 'Until it becomes a cost effective tool, the Germans have no real need for micro.' Certainly the impression is that it's practical considerations, not euphoric impulse, that sells hardware in Germany. The QL has the advantage of bundled software, but whether the natives will take to the Microdrives is highly questionable.

Other items of interest to the UK observer included MSX business software on cartridge, abundant MSX-DOS systems, but only Spectravideo and Sony machines to run them on, and Seiko's pocket colour TV.

Visitor after visitor, sat down in front of Apple's video screens, or squeezed into one of the many 'presentation booths', but the machines themselves, with one or two exceptions, stayed firmly on the shelves.

Nearly 60 per cent of West Germans, according to a recent survey, consider themselves to be ill-informed about computers. Less than eight per cent own a micro, and with a serious lack of centralised education policies the chances of finding out about new technology are sadly restricted.

CRESTA RUN — It's just a small step from the arcades to the Spectrum, as Incentive (0734-591678) intends to demonstrate with Moon Cresta. It has bought the licence to transfer Nichibutsu's arcade game on to any personal computer, starting with the Spectrum and the Commodore 64. The company is offering a prize to the first player to score 30,000 points — the original arcade machine. The cassette version costs £6.95.

Atari pushes Jac to upstage Commodore

There are now more than three million Commodore 64s. It's arguably the world's most successful small computer but the machine casts a small shadow in US microcomputing because it can't be expanded, lacks compatibility, and is several years old.

Of those millions of Commodore users at least a third are ready for a serious upgrade. They've had the hors d'oeuvres of microcomputing, they've had games, word processing, and lots, lots more, but they've also had to put up with Commodore disk drives and all the rest of the familiar litany. Besides, they read magazines and they dream their dreams.

They're ready for their cheap Mac/32-bit type home computer with 512K of RAM, loads of ports, great graphics, etc etc.

This Christmas Commodore passed up the greatest sales opportunity in history. The figures are brutal, indicating a 93.6 per cent decline in earnings from the $50 million they took in the quarter ending on December 31, 1983 to the $3.2 million for the same quarter in 1984.

At the January Consumer Electronics Show Commodore finally showed the 128, a good looking upgrade for its line. It even made it compatible with the 64, thus shattering company traditions. The 128 has new disk drives and lots, lots more.

Except it may be too late. At the same show Jack Tramiel showed off the Atari ST Jacintoshes which are based on the 68000 chip and look like 'a poor man's Mac', as certain software vendors put it at CES. Except that unlike the Mac, the Jac has a great big keyboard with cursor keys and numeric pad, not to forget the two-button mouse.

The Jac has similar graphics to the Mac except that on a colour screen the resolution isn't as good. Of course, games and colour go together in a lot of users' minds and colour games that take advantage of 512K of RAM and all the ports on the Jac should be quite astonishing to behold. Again, like the Mac, the Jac offers 128K or 512K versions but unlike the Mac (512K for $2,000 in New York) the Jacintosh will be priced at $400 and $700. If Atari can bring this machine to market in six months, Tramiel will have pulled off his greatest commercial coup. The ST line will bring the advances seen in business computers these last two years into the home market, along with powerful peripherals like the Atari hard disk system — 15Mb for $399 (perhaps by June).

Some older micro enthusiasts react with a degree of awe to the idea of home hard disk systems on sale at the toy store. Tramiel says simply: 'What a machine does is up to the user.' He'll continue to distribute through the big chains like Toys R Us and K-Mart.

But those who can bring themselves to forego 'the purchasing environment' of specialist computer stores (where there was some sneering at the Jac last week in the midst of all those integrated software packages that cost more than Tramiel's new computer) will save themselves a cool $2,000 and still have all the computing power they'll need for the next five years.

And only a year ago Tramiel seemed all washed up. He'd retired from Commodore at the height of its success. Why? At the CES he gave a rather enigmatic answer: 'Because I could no longer come into work with a smile on my face. I just wasn't happy any more.'

Loafing on the beach didn't suit Jack. He missed the thrill of combat and besides, when he visited his son Sam in Tokyo, he found that the Japanese were smiling 'because Tramiel is now out of the industry, and now they could come in'. So Tramiel raised risk capital in Hong Kong, Taiwan and the US like some taipan of the Jumbo Jet age. He then called his sons together and relieved Warners of the dying weight of Atari, drowning in red ink, and re-forged the company around the 'Tramiel religion' which is basically 'Work until you drop, wake up, resume work'. Of what happened to the old Atari, bristling with managerial fiefs, Tramiel said brusquely: 'You cut out the waste.'

Commodore, of course, is not out of the game yet, but it will have to bring the 68000-based Amiga to market this summer and it will have to be very good.

Which would mean a pair of 68000-based Mac-style home computers on the market in time for the anticipated sales rush. Christmas billions will be in the balance so the appearance of these machines, Jac and Amiga, will be the micro event of the year.

Chris Rowley

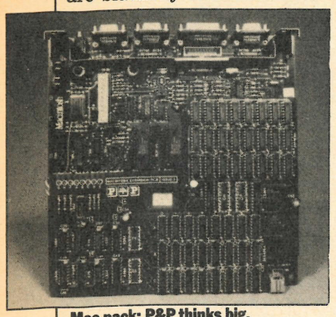
MONITOR

HOMEFRONT

New attractions pour forth for Macintosh

The momentum behind the Macintosh shows no sign of slackening, as Apple expands its promotions and independent suppliers come up with the goods.

The inducements that Apple is offering potential customers are blatantly commercial and



Mac pack: P&P thinks big.

MacBingo could be here before long. But the real goods are coming from elsewhere — Systematics and P&P (formerly Pete and Pam) in this case.

Systematics is a well-established supplier of business software and its contribution to the Mac catalogue is along its usual lines. MacBusiness is a suite of accounting packages specifically designed for the Mac and for first-time users.

The package's functions aim to give you greater control over debtor and creditor accounts with statements on demand, automatic production of profit and loss reports, VAT reports, maintenance of various ledgers, and some forecasting potential.

In the context of microcomputing, Systematics doesn't work cheap. MacBusiness costs £600, but it will be available as part of the Test-Drive promotion so you won't have to shell out £600 on trust. The package also runs on the Lisa 2, now known as the Macintosh XL.

P&P has announced the P&P Mac Expansion Card, a means of upgrading an ordinary 128K model to the 512K version for £500. The board has six banks of 64K DRAM. It must be installed by P&P and the company warns that your Apple warranty will be invalidated. This being the case, P&P will assume responsibility for the warranty — for 13 months on a brand new machine, and for the remaining period plus one month on a used Mac.

Audiogenic offers spreadsheet trial

Considering a spreadsheet? For a Commodore 64? Audiogenic is experimenting with a trial-period service on software called Micro Swift.

This isn't exactly unique in the annals of software selling but it's unusual in this price bracket. Micro Swift costs £19.95; to get a demo cassette send Audiogenic a cheque or postal order for 50p, which will be refunded if you decide to buy the full program.

The demo version, Audiogenic says, is identical to the real thing except that the Load, Save and Print routines have been left out and working memory is restricted.

Other commands and functions are there, with a pop-up menu control system that the company claims is exclusive to the package. Audiogenic is on 0734-664646.

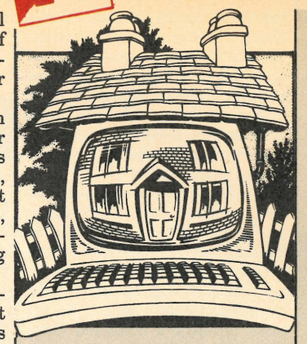
Fuji crams 1Mb onto 3.5in floppy

The 1Mb Fuji floppies that have surfaced at occasional trade shows over the last 12 months are at last available in the UK.

Magnum Media (0734-734849) has launched the 3.5in disks with a promise to replace any faulty disk and to bear the cost involved if you lose data on them.

A single-sided, double density disk holds 250K; a double-sided, double-density, double-track unit has room for 1Mb. The cost of storage at these rarefied heights will be roughly £6 per Mb.

ONCE UPON A MODEM — It's called the Answercall 100, it costs £86.25, and to judge from its spec it's the kind of unit that bulletin boards thrive on. The manufacturer, also called Answercall (which it does, on 01-659 1133), has BABT approval for the device which will be distributed by DLE communications. The Answercall 100 is a 300 baud unit with LEDs to indicate Power On and Carrier Detect, and with switches for On/Off, Answer, and Originate. See *PCN*, issue 98, for a full report on the state-of-the-art in modems and communications.



Pass the hat for our friend Acorn

With its share price falling faster than the pound against the dollar, Acorn battened down the hatches last week and ran for cover. The country's number two micro maker badly needs a confidence booster, but it's hard to see where that might come from.

The confidence of the men who matter in the City of London has been draining away since the turn of the year, when it became apparent that Acorn's Christmas sales had been disappointing.

The city was impressed enough with Acorn in late 1983, when the company issued shares at a price of 120p each. Later the price rose to 193p; last week it fell to 23p at one stage.

In late 1983 the BBC Micro wasn't two years old and the Electron had only just been announced. Acorn's financial results for the year up to July 1983 gave it profits of £8,632,000 on turnover of more than £42 million.

Apparently a reputation for late product launches, delayed development projects, and almost complete deafness didn't trouble the City. Until the middle of 1983 it was close to impossible to get anything out of Acorn — its telephone was perpetually engaged. Its planned expansion of the BBC system proceeded very slowly, and third party suppliers regularly beat it to the punch with BBC add-ons. But the company continued to prosper, thanks largely to the BBC contract.

Then 1984 saw the Electron revealed as inadequate in the face of strong competition. Acorn stayed aloof from the price-cutting fever that swept the home computer business. The fact that the BBC Micro's price was steady looked like a sign of stability and good health at Acorn — but it didn't help sales overseas, and led eventually to the US debacle.

Between January 1983 and December 1984 Acorn flirted with the US market but it made little impression as the battles involving Apple, IBM, Commodore and Atari brushed it aside. A staff of five was left from the peak of 40.

Back home in the same period some traditional Acorn problems — shortages of ROM chips and disk interface components, late arrival of second processors, indecision over pricing — refused to go away. The prospect of a contraction in its education business also loomed. But the company expanded on the home front as well as abroad. It took over a networking company called Torus, and made the first move towards buying Torch. It's 'Plan for growth' up to 1990 included a 12 acre expansion of its base at Cherry Hinton, near Cambridge, and the recruitment of 500 extra staff.

As Christmas 1984 approached, Acorn was buoyant. 'We did not turn the production tap off over the summer period,' said a spokesman, referring to the steps the company had taken to avoid a repetition of the previous year's shortages. It got a shot in the arm at the same time from a well-publicised survey — Acorn systems, the survey showed, were among the most reliable on the market. Since the survey had been carried out on behalf of Acorn's advertising agency it wasn't surprising to find the results presented in pre-Christmas ads, to go with the expensive television advertising campaign. Indirectly this led to the fracas between Sir Clive Sinclair and Chris Curry in a Cambridge wine bar at the end of the year.

Sir Clive stuck the boot in with more effect when he chopped the price of the Spectrum Plus. Acorn responded by lopping £70 off the price of the Electron. As its dealers complained, it trimmed the number of its distributors from 17 to six in the interests of efficiency. Alex Reid, ex-British Telecom, was appointed chief executive — perhaps to persuade the City that experienced hands were in control at Acorn. But Reid had no time to make an impact — within days of his appointment, and with the share price tumbling, Acorn dropped its bankers and financial advisors, lost its brokers, saw the Torch deal slip away, and finally asked the Stock Exchange to suspend trading in its shares.

Having chosen to go to the City for funding in 1983, Acorn can only survive on the City's terms. That means restoring confidence — and that means finding a lot of money. Will anybody pass the hat round for a beleagured computer company? If you haven't got a penny, a ha'penny will do . . .

David Guest

CHARTS

GAMES

TW	LW	TITLE	PUBLISHER	MACHINE	PRICE
1	1	Ghost Busters	Activision	SP,C64	£9.95
2	2	Match Day	Ocean	SP	£6.90
3	3	DT'sDecathlon	Ocean	SP,C64	£6.90
4	5	Elite	Acornsoft	AC	£6.95
5	6	Blockbusters	Macsen	SP,64,AC,AM	£7.95
6	4	Airwolf	Elite	SP,	£7.95
7	7	Technician Ted	Hewson	SP,AM	£5.95
8	8	Impossible Mission	CBS/Epyx	C64,AT	£9.95
9	9	Select 1	Comp Records	SP,C64	£12.49
10	12	Zaxxon	US Gold	SP,C64,AT	£9.95
11	11	Knight Lore	Ultimate	SP	£9.95
12	10	3D Star Strike	Real Time	SP	£5.95
13	15	Monty is innocent	Gremlin	SP	£6.95
14	16	Blue Max	US Gold	SP,C64	£9.95
15	19	Frak!	Aardvark	C64,AC	£7.90
16	20	Gift from the Gods	Ocean	SP	£9.95
17	—	Skool Daze	MicroSphere	SP	£5.95
18	13	Hunchback II	Ocean	SP, C64	£6.95
19	—	Intl Soccer	Commodore	C64	£9.95
20	14	Doomdark's Rev.	Beyond	SP	£9.95

SPECTRUM

TW	TITLE	PRICE
1	Ghost Busters	£9.95
2	Match Day	£6.90
3	Airwolf	£6.95
4	Technician Ted	£5.95
5	Zaxxon	£9.95
6	Knight Lore	£9.95
7	Daley Thompson	£6.90
8	3D Star Strike	£5.95
9	Monty is Innocent	£6.95
10	Blockbusters	£7.95

COMMODORE

TW	TITLE	PRICE
1	Ghost Busters	£10.90
2	Impossible Mission	£9.95
3	Frak!	£7.90
4	Intl Soccer	£9.95
5	Select 1	£12.49
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These charts are compiled from both independent and multiple sources across the nation. They reflect what's happening in high streets during the week up to **February 7**. The games chart is updated every week. The prices quoted are for the no-frills model and include VAT. Information for the top-selling micros is culled from retailers and dealers throughout the country and is updated every month. PCN Charts are compiled exclusively for us by RAM/C, who can be contacted on 01-892 6596.

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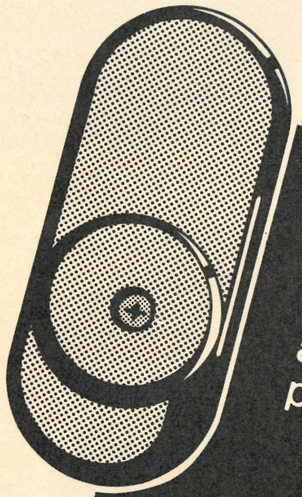

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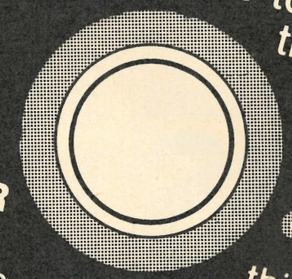

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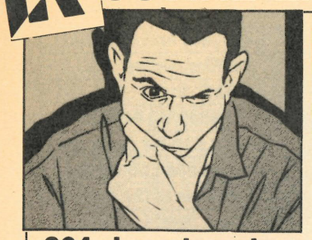

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C64 character set confusion squared

Q Before Christmas I bought your magazine and at Christmas I got a Commodore 64. I decided to type in one of your programs, Goal Power by Andy Clarke.

I got to line 304 before encountering some signs that I can't get from my keyboard. They are open square bracket, small s, capital q, close square bracket [sQ]. Can you tell me how to do these?
Russell Baker,
Camberley, Surrey.

A Sorry, this one is our fault — we should have explained it at the time. It is a printing convention used by many magazines and books which arises out of the difficulty in accurately reproducing the Commodore character set for things like graphics, colour and cursor controls.

Instead, we use a program which converts those tricky characters into more recognisable symbols. In the case you mention, [sQ] means press the SHIFT key and the Q key together to get the proper graphics symbol.

Other conventions include using a 'c' for the Commodore key, things like UP, DN, etc for cursor controls, and RED, GRN, BLK, etc for colours. Don't type in the square brackets, simply press the keys enclosed between them.

You might also come across some listings which use the ^ character instead of 's'. Use SHIFT when you see this too.

Compatibility query on C128 upgrade

Q You recently previewed the Commodore 128 and from what was said it sounds like an ideal machine as an upgrade for my 64.

However, you said it is 100 per cent compatible with the 64 but I have read from a different magazine that it will be only partially compatible. If it is totally compatible, does this apply to disk software and fast-loading tape programs?

Finally, when will it be available and how much will it sell for?
F Wong,
Portsmouth, Hants.

A We stand by our story, although where unreleased products are concerned you'd be well advised to take everything with a pinch of salt.

But, Commodore insists that the 128 will be totally compatible with the 64 thanks to an upgraded version of the 64's 6510 processor. This will allow a hardware-switchable emulator mode. We suspect there may be a catch with fast-loading tapes, and you would be sensible to hang on to your 1541 disk drive in case an upgraded drive presents unforeseen problems.

As to availability and price, Commodore has made no announcements yet. Watch *PCN* for developments . . .

Kempston interface brings no joy

Q I have purchased a Kempston joystick interface for my 48K Spectrum. I have tried using this for playing Psytron but it only changes screens five, six, seven and eight, probably because it simulates pressing the cursor keys. Is there any way I can overcome this?
Pat Breen,
Dublin.

A The Kempston interface doesn't actually emulate keys at all — it uses the IN command. Pystron appears to be one of those games that doesn't work very well with a joystick, simply because there are too many keys involved.

There's very little you can do about this with the Kempston, as there's no way to change the keys used. If you felt like investing in a programmable joystick, however, you might be able to use a joystick instead of at least some of the keys.

The Comcon interface, for example, allows you to connect left, right, up, down and two fires to any keys you like, so you get a lot more flexibility. But our Psytron expert tells us it's not difficult to play on the keyboard anyway, so what's the problem?

New printer puts a spanner in the works

Q I own a ZX81 with a Memotech 64K memory and have been using, without any problems, utility software programs written in machine code, *ie* a database, an assembler and recently a word processor. For the latter I bought an Alphacom 32 printer which is adequate for my current requirements.

My problem? With the printer physically connected all my programs LOAD but the system crashes when I try to operate them. I have tried two other Alphacom 32 printers, with the same result.

On removing the printer from the system everything works normally again. There appears to be no problem when writing programs in Basic. Is there any way I can amend my software by PEEKing and POKEing or am I stuck with an unusable printer?
C H Gardner,
Newcastle.

A A classic case, we're afraid. Before you buy an add-on you really should check to see if it works with your other add-ons.

The Alphacom won't work with your Memotech RAM-pack, and according to Memotech, won't work with any Memotech product for the ZX81. The problem seems to be that Alphacom and Memotech use some of the same lines, so their products aren't compatible.

Memotech claims this is Alphacom's fault, as Memotech was there first, but from your point of view it doesn't make a great deal of difference — you've either got a useless RAMpack or a useless printer.

Putting my Toshiba to productive use

Q I have recently acquired a Toshiba HX-10 computer. I am not a games fanatic and do not wish to spend all of my time playing games but would like to do something more productive with my computer. Could you please give me some suggestions as to what use I can put my Toshiba? I am extremely new to computing and would obviously need instructions.
S Clark,
Ely, Cambs.

A Since you are obviously very new to computers then our first suggestion is learn more about the machine that you have got.

First you should learn Basic. Once you have mastered this programming language then you should be able to write your own programs without too much bother.

If you aren't into games, then what about writing a program to store all of your friends names and addresses? You could even put their birthdays into your computer and ask it to print out a list of forthcoming birthdays.

There are numerous other programs that you could write; they are only limited by your imagination and ability.

One book that should help you on your way is *The Complete MSX Programmers Guide* from Melbourne House. Parts of this book will be too advanced for you at the moment but as you learn more it should become an invaluable reference.

Releasing the RAM held inside Oric

Q I have been using machine code on my Oric and have come up against some problems. I need the ROM calls for VAL, STR$, CSAVE, PLOT and SCRN. Also, is there an unpublished 'STZ' op-code and if so what are its op-codes for the various addressing modes?

Is there any way I can release the extra 16K RAM that is overlaid by the Oric's ROM and can I use the 6522's A port for input/output? This would solve sound interference problems when using port B. Finally, is there an error vector in the zero page?
R Brooksby,
Chandlers Ford, Hampshire.

A Whew, a tall order, but here it goes. We can't help on the ROM calls, Oric was never very forthcoming on that subject, though you may be able to get some advice from Tansoft.

On the Atmos, addresses &H1B and &H1C (27 and 28) are used for the error vector, but the ROMs of the two machines aren't identical.

Yes, there is a 'store zero' instruction, but we don't know much about it because, as you point out, it's unpublished. Your best bet would be to get hold of a 6502 data sheet and experiment.

However, don't forget that, because it's not well-known, few assemblers will support it, so you'll have to hand-assemble sections of code that use it.

The only way to free up that 16K is via the system bus, so you'll need some hardware to set the address lines to page out the ROM. On the Atmos, pin 2 of the expansion socket is called ROMDIS, which may help. The Atmos manual contains diagrams of all the Atmos I/O connections.

As far as we can make out, port A is used to map the controlling registers in the VIA onto memory (page 3), so it doesn't look as if you can use port A in the way you want.

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Use UDGs for taller characters

Print a string of double-height characters on the ZX Spectrum with this routine.

It works by copying the dot patterns for the character codes of the string from ROM to a pair of UDGs (S and T). These are then printed on top of one another.

To use the subroutine at line 9000, three variables must be set up. t$ is the string to be printed, x is the column number (0 to 31) across the screen, and y is the row number down the screen. The string should fit into the current line.

Dilwyn Jones,
Bangor, N Wales.

```
10 INPUT LINE t$
20 PRINT AT 0,0;t$
30 LET y=5
40 LET x=0
50 GOSUB 9000
60 STOP
9000 IF t$<" " OR t$>CHR$ 127 THEN
RETURN
9010 LET base=PEEK 23606+256*PEEK
23607
9020 FOR c=1 TO LEN t$
9030 LET cde=CODE t$(c)
9040 LET address=base+8*cde
9050 FOR r=0 TO 15 STEP 2
9060 POKE USR "s"+r,PEEK address
9070 POKE USR "s"+r+1,PEEK address
9080 LET address=address+1
9090 NEXT r
9100 PRINT AT y,x+c-1;CHR$ 162;AT
y+1,x+c-1;CHR$ 163
9110 NEXT c
9120 RETURN
```

Avoid Spectrum caps lock side-effects

Here's a handy alternative to the usual way of enabling the caps lock on the Spectrum *ie* poking location 23658 with 8, and then with 0 to disengage it. This method causes other unwanted efffects as 23658 holds other flags too.

Try using the routine at 4317 with RANDOMISE USR 4317 to toggle it on/off. Remember, however, this call produces strange effects command mode though it works fine in a Basic program.

R Indrayan,
Chiswick, London.

A change of speed for Beeb Basic

You can alter the processing speed of the Beeb's Basic with location &FE45 (6522 VIA TIC-H).

Use ?&FE45=1 to slow down the system and cause it to stop when a key is pressed (besides Escape and Break) — handy for debugging. Using ?&FE45=225 causes it to go about eight times faster although the keyboard is scanned very rarely. The normal value is approximately 32 and should be reset to this before exiting a program or waiting for an input from the keyboard.

The timer in location &FE45 appears to be the countdown till the next keyboard scan interrupt occurs.

Miles Wilkins,
Ipswich, Suffolk.

Disguise the Atmos ASCII codes

You can easily scramble the Atmos ASCII codes produced by the keyboard. Poking 524 with the value 0 renders the keys ineffective. Other numbers cause other effects: for an example, press 32.

M Eckstein,
Bexhill, E Sussex.

RANDOM ACCESS

Share your words of praise or send us a rocket about *PCN*. We want to hear your views and feelings on the articles we print — and those you feel we ought to. Write to *Random Access, Personal Computer News, Evelyn House, 62 Oxford Street, London W1A 2HG.* You could win £15 for the best letter of the week.

An unpleasant kind of experience

I would like to warn your readers about a company called COMP-U-CARD.

About two months ago, I received a Compucard (which looks just like a credit card). The literature that accompanied it promised some amazing offers, none of which interested me.

After I sent a nasty letter to the managing director I was assured they were sorry and wouldn't bother me again, and would inform me where they had obtained my address and buying habits (all the Compucard goods seemed aimed at buyers of hi-tech goods).

It have since received no less than six more Compucards. I retaliated by filling the FREEPOST envelopes with heavy scrap metal, hoping that the postage bill would deter them, but this morning yet another of the dratted things dropped through my letterbox.

Through the pages of your magazine, I invite any Compucard representative to offer an explanation. I am convinced that there is a large mainframe somewhere with my name and address and my buying habits. It seems as I don't have much choice about who keeps information about me, or to alter it should it be wrong. Well, it was 1984 last year.

Peter Grimes,
Warrington, Cheshire.

A change of distributor for Samna

I read with interest Geof Wheelwright's review of Samna Word III in issue 95.

The only thing that bothered me was that, in your information box, CBIS was specified as being the outlet for the product. This was the case until recently but Thorn EMI Computer Software Distributors is now the sole supplier in the UK of the Samna products.

Georgie Gibbs,
The Grayling Company,
London SW1.

Viking Erik's true place of origin

I am glad Bob Chapell enjoyed The Saga Of Erik The Viking (issue 96).

I would like to point out that Mosaic Publishing is an independent software house (not an imprint of John Wiley as mentioned in the article). Our association with John Wiley is a separate agreement whereby it handles the marketing of our publications.

Your readers may like to know that Erik is now available for the Amstrad CPC 464.

Vicky Carne,
Mosiac Publishing, London N1.

Enterprise — taking more points on-board

We were pleased to read Stuart Cooke's in-depth review of the Enterprise 64 (issue 94). Although we were particularly pleased to see that he liked the keyboard, we would like to clarify a few points.

First, the built-in word processor. Text is in fact edited by entering the word TYPE, not TEXT, as stated. Text entered in 40-column mode (usual when using a television) can be stored, then reformatted into 80-column mode using the function keys. You can use a domestic television as the text need only be observed in 80-column mode, not read.

Sound is emitted through the Enterprise 64's internal speaker, not through the television, so users with a monitor can still hear the key click.

Board edge fingers are proven to be the most cost effective and reliable method of connecting peripherals. The design of the Enterprise's mouldings gives support to the connection and moulded 'pips' prevent cables being inserted incorrectly. Although we did not think it necessary to include descriptions of output connectors in the *Basic Programming Guide*, we are always willing to supply this information from head office, and will include it in the forthcoming *Technical Manual*.

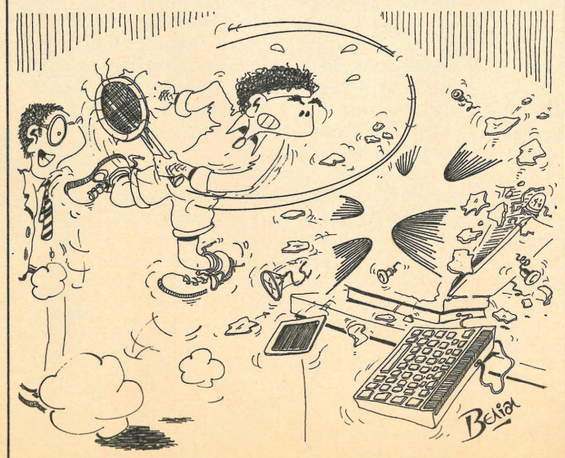
Similarly, an in-depth description of programming in machine code will be detailed in the Technical Manual. We think our introductory documentation comprehensive, but if a beginner's introduction manual is needed, we would be keen to speak with prospective authors.

In common with many home computers, including the Spectrum and the BBC, the Enterprise does not have built-in hardware 'sprites', and good graphics games for these machines show this is not a problem. But a software sprite generator for the Enterprise is under development to help the amateur games programmer. The Enterprise video chip *Nick* does include sprite priority encoding and these signals are available on the expansion bus. This would enable a hardware sprite generator to be connected if one were produced at a future date.

The review model seemed to be suffering from a couple of niggles, namely a 'buzzy' transformer and an unloadable demonstration cassette. We are happy to say that these are isolated cases and not representative of our production quality machines and software.

The success of any home computer manufacturer depends on the software available. The Enterprise offers tremendous opportunities to programmers, which software houses have been quick to realise. We are currently working with several major software house to produce new programs and convert existing ones.

Steve Groves,
Head of Technical Support,
Enterprise Computers, London.



Maybe tennis simulation games weren't a good idea after all

Why a Memotech isn't top of the pops

Although the Memotech MTX has had excellent reviews, and *PCN* has itself endorsed them, Memotechs have failed to sell in great numbers. The fault is not in the machines themselves — the hardware and firmware are excellent, most peripherals are available and it is the only sub-£200 micro capable of expandability to a true 80-column CP/M machine. Moreover, despite the fact that most major software houses have ignored it (Level 9 excepted), software is really no problem, as a large number of titles are available.

The MTX is the only Z80 micro that allows Basic programs over 64K in length — if the box says 128K on it, that's how much Basic will fit in it. And if success is measured in terms of game playing ability the Memotech should be at the top.

The reason the Memotech has not been as successful as it deserves lies in the fact that other than readers of *PCN*, no-one has heard of it — neither the retailers, nor the public, not even fellow enthusiasts.

This is where Memotech's failing has been — the marketing of the machine has been weak since the machine's conception. The result showed in the disappearance of the MTX from the *PCN*'s charts in the few weeks before the event. What is now required is an intensive marketing campaign to make the public well aware of the advantages of the MTX.

Nic Joynson,
Highcliffe, Dorset.

SPRITELY MOVEMENTS

Put some movement into your Spectrum's sprites with this machine code routine from Stuart Nicholls. Follow his instructions and you could design your own professional-looking software games full of spritely animation.

A major shortcoming of the Spectrum, as far as Basic games programmers are concerned, is the lack of computer controlled sprites. It is virtually impossible in Basic to keep track of more than three objects moving simultaneously around the screen and maintain a reasonable playing speed. However, this can be simply rectified with the following machine code routine.

It keeps track of up to 16 on-screen sprites at any one time using a set of user definable sprite parameters to govern speed, direction, bounce etc, of each sprite.

Although the machine code takes up under 1K you must allocate a further 10K for data comprising a screen dump (6K) and for 16 figures of 1/4K each. If you look at Table 1 you will see how the memory is allocated and you will notice a further block of data called Sprite Attributes at address FA00h (64000d) which, for Basic programmers, is the most important part of the whole program: it is this block of memory that is used to monitor the sprites.

Table 2 shows a further break down of this area of memory and gives details of the Sprite Attribute functions and values. For example, suppose you require a sprite to move quickly left to right across the screen and to bounce off a RED INK/WHITE PAPER object you should set up SPRITE 1 ATTRIBUTES as:

POKE 64001, 0	Very fast
POKE 64002, 0	No vertical line movement
POKE 64003, 1	Start by moving left to right *ie* column increasing
POKE 64004, L	The value of L will depend on the screen position you wish to start from Movement is half character square so that LINE values have a range of 0 to 47
POKE 64005, C	Again this is the column start position and has a range of 0 to 63
POKE 64006, 58	Attribute for INK RED/PAPER WHITE
POKE 64006, FIG	You may select from any of the 16 figures you have previously placed into memory (range 0 to 15)

Once the sprite attributes are set up, it is a simple matter to switch the sprite on, and make it appear on the screen, with POKE 64000, 1.

Now you can forget about it as it will go on merrily bouncing from side to side (with a wrap around screen if only one obstacle is put in its path) without needing any more Basic commands: the program is interrupt driven, leaving you free to continue with any Basic programming.

Sprite attributes may be changed at any time to give an increase in speed, or a diagonal movement, which will give a realistic bounce of a predetermined screen attribute, or you could even change the figure used.

The computer may control the sprites, but there is an exception to this with sprite 16, whose direction is controlled from keyboard using keys Q/A for Up/down and O/P for left/right (anyone with a knowledge of machine code may change the program to use other keys). This sprite bounces off a preselected screen attribute and also has collision detection. That is, if sprite 16 collides with any other sprite, the computer detects this, and it's easy to control this from Basic.

PEEK 23728 = 0 for NO HIT
PEEK 23728 = 1 for HIT

The method I have chosen for designing figures is different from that normally used in that each sprite occupies its own screen layer. So if all 16 sprites are on the screen together the screen is built up of 17 layers including the original screen. This means a lower numbered sprite occupying part of the same screen area as a higher number will be covered, but if you use a special masking technique parts of the lower number sprite will show through.

All sprites, however, take on the screen attributes. Because we are using half character square movement, we must produce four separate pictures for each figure. Figure 1 is a simple open shape design and shows clearly the requirements of the four pictures. Picture 1 occupies the top LH 1 1/2 character squares with a one pixel margin, picture 2 the top R H 1 1/2 character squares and so on. (See page 15.)

Note, however, that each picture is composed of a black area for the design and a grey area which defines the masked area for the design, *ie* how much

Listing 1

```
ZX Spectrum 48K HEXDUMP
Sprite M/Code 64256,699
FB00  F3 F5 E5 D5 C5 3A 1D FB = B9
FB08  3C C2 4E FB 21 00 40 11 = B9
FB10  00 D2 01 00 18 ED B0 32 = BA
FB18  1D FB C3 4E FB 00 00 CB = EF
FB20  39 CB 38 79 0F 0F 0F E6 = C8
FB28  E0 A8 5F 79 E6 18 F6 40 = 94
FB30  57 C9 7B 3C E6 1F 28 02 = 06
FB38  1C C9 7B E6 E0 5F C9 7B = C9
FB40  C6 20 5F D0 7A C6 08 57 = B4
FB48  FE 58 C0 16 40 C9 CD 08 = 0A
FB50  FD CD 54 FC CD 64 FB CD = 13
FB58  B5 FB CD 36 FD C1 D1 E1 = 23
FB60  F1 C3 38 00 21 00 FA E5 = EC
FB68  CD 75 FB E1 3E 08 85 6F = 58
FB70  FE 80 20 F3 C9 7E A7 C8 = 47
FB78  23 3A 78 5C A6 C0 23 7E = 38
FB80  23 B6 C8 23 4E 23 46 CD = 48
FB88  1F FB 21 00 92 19 0E 05 = F9
FB90  D5 06 08 D5 7E 12 14 24 = 80
FB98  10 FA D1 CB 39 30 09 CD = E5
FBA0  32 FB 21 00 92 19 18 E9 = FA
FBA8  D1 79 A7 C8 CD 3F FB 21 = E1
FBB0  00 92 19 18 DB 21 00 FA = B9
FBB8  E5 CD C6 FB E1 3E 08 85 = 1F
FBC0  6F FE 80 20 F3 C9 7E A7 = EE
FBC8  C8 23 3A 78 5C A6 28 08 = CF
FBD0  23 23 23 4E 23 46 18 08 = 40
FBD8  CD 38 FC 77 CD 4C FC 77 = 04
FBE0  AF CB 40 28 01 3C CB 41 = 2B
FBE8  28 02 C6 02 0F 0F 32 1E = 60
FBF0  FB CD 1F FB 23 23 7E E6 = 8C
FBF8  0F 21 00 EA 84 67 3A 1E = 5D
FC00  FB 6F 0E 05 D5 06 08 D5 = 35
FC08  1A A6 23 B6 12 23 14 10 = F2
FC10  F7 D1 CB 39 30 05 CD 32 = 00
FC18  FB 18 EA D1 79 A7 C8 CD = 83
FC20  3F FB 18 E0 CB 39 CB 38 = 39
FC28  79 0F 0F 0F 4F E6 E0 A8 = 63
FC30  5F 79 E6 03 EE 58 57 C9 = 27
FC38  23 54 5D 23 23 1A 86 FE = B8
FC40  FF 20 02 3E 2F FE 30 20 = DC
FC48  01 AF 4F C9 23 13 1A 86 = 9E
FC50  E6 3F 47 C9 21 00 FA E5 = 35
FC58  CD 65 FC E1 3E 08 85 6F = 49
FC60  FE 80 20 F3 C9 7E A7 C8 = 47
FC68  23 3A 78 5C A6 C0 CD 38 = 9C
FC70  FC CD 4C FC CD 24 FC 23 = 21
FC78  06 00 D5 1A BE 20 01 04 = D8
FC80  CD 32 FB 1A BE 20 04 78 = 6E
FC88  C6 03 47 D1 7B C6 20 5F = A1
FC90  30 08 14 7A FE 5B 20 02 = 41
FC98  16 58 1A BE 20 04 78 C6 = A8
FCA0  05 47 CD 32 FB 1A BE 20 = 3E
FCA8  04 78 C6 07 47 78 A7 C8 = 77
FCB0  2B 2B 2B CB 46 28 47 2B = 2C
FCB8  CB 46 28 49 23 FE 06 28 = D1
FCC0  3E FE 0A 28 3A FE 08 28 = D6
FCC8  30 FE 04 28 31 FE 0C 28 = BD
FCD0  2D CB 5F 20 24 FE 01 28 = C2
FCD8  1A FE 03 28 10 FE 05 28 = 7E
FCE0  06 36 FF 2B 36 FF C9 36 = 9A
FCE8  01 2B 36 FF C9 36 FF 2B = 8A
FCF0  36 01 C9 36 01 2B 36 01 = 99
FCF8  C9 7E EE FF 3C 77 2B 7E = 90
FD00  EE FF 3C 77 C9 23 18 F7 = 9B
FD08  21 7A FA 16 00 01 FE FB = A5
FD10  ED 78 CB 47 20 01 15 01 = AE
FD18  FE FD ED 78 CB 47 20 01 = 93
FD20  14 72 23 16 00 01 FE DF = 9D
FD28  ED 78 CB 47 20 01 14 CB = 77
FD30  4F 20 01 15 72 C9 3A 78 = 72
FD38  FA A7 C8 ED 4B 7C FA 79 = 90
FD40  3D FE FF 20 02 3E 2F 3D = 06
FD48  FE FF 20 02 3E 2F 5F 78 = 63
FD50  3D 3D E6 3F 57 21 00 FA = 11
FD58  E5 D5 CD 75 FD D1 E1 38 = E3
FD60  0E 7D C6 08 6F FE 78 20 = 5E
FD68  EF 21 B0 5C 36 00 C9 21 = 3C
FD70  B0 5C 36 01 C9 7E A7 C8 = F9
FD78  23 23 23 23 0E 05 D5 06 = 7A
FD80  05 7E 23 BB 20 04 7E BA = BD
```


Listing (cont)

```
FD88  28 15 2B 14 7A E6 3F 57 = 72
FD90  10 EF D1 0D C8 1C 7B FE = 3A
FD98  30 20 E3 16 00 18 DF D1 = 11
FDA0  37 C9 21 1D FB 36 FF 21 = 8F
FDA8  00 FB 22 FF FE 3E FE ED = 43
FDB0  47 ED 5E C9 3E 3F ED 47 = 0C
FDB8  ED 56 C9 = 0C
```

of the previous layers of sprites/screen show through when the figure is printed on the screen. It is usually best to leave an unmasked area around each design so the figure shows clearly if printed onto a solid ink block. In Figure 1 (on page 15) the centre of the design has been masked to allow the figure to appear open on the screen.

It is also possible to produce a simple form of animation. Figure 2 shows a man in slightly different positions in each picture but still generally keeping to the correct 'corners'.

Once you have your figure designed in this way you need to convert each picture and mask into blocks of eight data bytes starting with picture 1a, 1b, 1c, 1d, then 2a, 2b, etc to 4d. Then tabulate the values as in Table 3.

All the remains is to allocate a figure number to your design, look up the start address of that figure using Table 1 and poke the values into memory starting from that address. The order of data is: Picture 1a: mask byte, data byte, mask byte, data byte etc to Picture 4d a total of 256 bytes.

To enter the machine code use a hexloader (the one in *PCN* issue 95 is suitable) and the type in the code as in Listing 1. Remember to clear RAMTOP to 64255 before entering this code. Once entered, save it using SAVE "control" CODE 64256 ,699.

Once you have a figure set up in memory, you can test it out by entering RANDOMISE USR 64930 to switch on the interrupt driven routine. However before switching on the routine you must have RAMTOP set to 53759 and your 'start screen' printed as it is this screen that is copied to the screen dump (once only) by the machine code to be used when erasing sprites as they move. Note that the attributes are not copied so they can be altered at any time to affect the bounce of sprites.

If you wish to change screens or switch off the sprite routine use RANDOMISE USR 94948.

Lastly, Basic programs are slowed down when this routine is on because you still call the ROM KEYSCAN (RST 38h) which allows the Spectrum to be used as normal for program editing and so on. ◪

Table 1: memory map

Description	Start address Hex	Decimal
Machine code	FB00	64256
Sprite attributes	FA00	64000
Figure 15	F900	63744
14	F800	63488
13	F700	63232
12	F600	62976
11	F500	62720
10	F400	62464
9	F300	62208
8	F200	61952
7	F100	61696
6	F000	61440
5	EF00	61184
4	EE00	60928
3	ED00	60672
2	EC00	60416
1	EB00	60160
0	EA00	59904
Screen dump	D200	53760

Table 2: Sprite attributes

Sprite No	Address of first attribute	Attributes/offset On/off 0	Speed 1	LA 2	CA 3	L 4	C 5	Barrier 6	Fig 7
1	64000								
2	64008								
3	64016								
4	64024								
5	64032								
6	64040								
7	64048								
8	64056								
9	64064								
10	64072								
11	64080								
12	64088								
13	64096								
14	64104								
15	64112								
16	64120								

Values for attributes

On/off	0 = Off, 1 = On
Speed	0, 1, 3, 7, 15, 63, 255 (0 = fast, 255 = slow) Note: other values will give jerky movement.
LA	1, 0, − 1: Direction of movement *eg* −1, −1 is
CA	1, 0, − 1: Diagonally left and up
L	0 to 47: Current screen position
C	0 to 63:
Barrier	0 to 255: The screen attribute that causes a bounce.
Fig	0 to 15: The sprite figure to be used (you may have up to 16 *different* sprites on the screen at any time)
Note	
1	Sprites 1-15 are computer controlled
2	Sprite 16 is Keyboard controlled and has collision detection with the other 15 sprites. Controls are Q/A — Up/Down O/P — left/right.

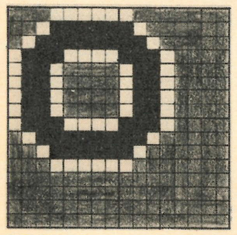
Table 3: Pictures

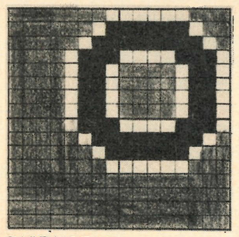
	Mask	Data
1a	224	0
	192	31
	128	63
	0	31
	0	74
	0	111
	0	104
	128	63
1b	127	0
	63	128
	31	192
	31	128
	15	160
	15	160
	15	224
	31	0
1c	128	15
	0	127
	0	105
	150	0
	255	0
	255	0
	255	0
	255	0
1d	15	96
	15	224
	31	128
	127	0
	255	0
	255	0
	255	0
	255	0

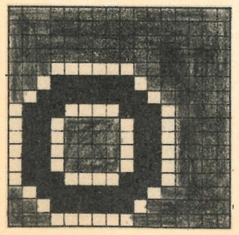
2a	254	0
	252	1
	248	3
	252	1
	248	1
	240	5
	240	5
	240	4
2b	7	0
	3	248
	1	252
	3	248
	1	88
	0	246
	1	20
	1	232
2c	248	3
	248	0
	240	7
	240	6
	249	0
	255	0
	255	0
	255	0
2d	0	246
	0	254
	1	148
	43	0
	127	0
	255	0
	255	0
	255	0

3a	255	0
	255	0
	224	0
	192	31
	128	63
	192	31
	192	10
	128	47
3b	255	0
	255	0
	127	0
	63	128
	31	192
	63	128
	15	128
	7	176
3c	0	104
	128	63
	192	7
	224	15
	128	13
	0	124
	3	104
	147	0
3d	15	160
	7	208
	15	128
	15	224
	15	96
	159	0
	255	0
	255	0

4a	255	0
	254	0
	252	1
	252	0
	248	2
	240	6
	240	6
	248	1
4b	3	0
	1	252
	0	254
	1	252
	1	172
	1	248
	0	74
	0	250
4c	248	0
	240	7
	240	7
	248	0
	255	0
	255	0
	255	0
	255	0
4d	0	126
	1	216
	3	88
	131	24
	193	16
	192	30
	192	22
	233	0


PICTURE 1


PICTURE 2


PICTURE 3

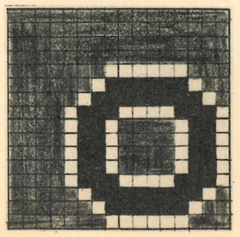
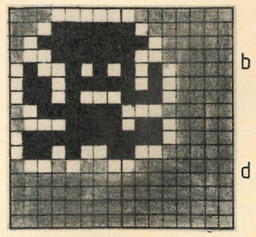
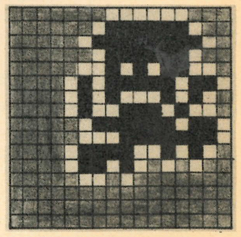
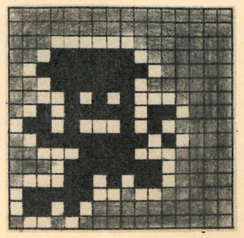

PICTURE 4

FIGURE 1



PICTURE 1


PICTURE 2


PICTURE 3

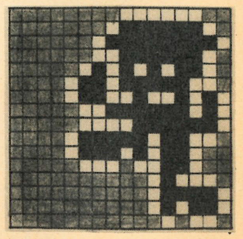
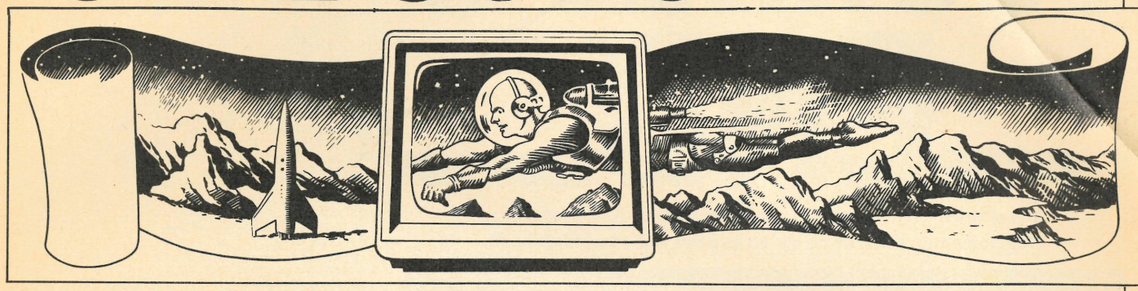

PICTURE 4

FIGURE 2

SIDE SCROLL

Right, left and diagonal scroll is possible with Steve Scovell's machine code listing.



The Amstrad Basic lacks a scroll command but it's possible to scroll left, right, and diagonally as well as the usual up and down with a bit of machine code. By using a CALL address command the routines can be easily accessed by any Basic programmer.

The machine code in the listing here is a package of three types of routine written with the games programmer in mind.

1 Scroll, left, right, up, down. There is already a firmware routine for up and down scrolling but it always blanks out the new line with an ink. The routine here does not.

2 Blank out. With the current paper ink the left edge, right edge, top and bottom lines.

3 Fill box. These boxes are one, two or three characters high and are printed at the left or right edge of the screen, with the current pen ink.

Each type of routine is modified easily with a few pokes.

The up, down, left and right routine is separate for ease of use. Although one routine could perform all four movements, you might want to change scroll direction in a program, which would involve several pokes.

How they work

The Scroll routine first calls the firmware routine &BCOB.GET OFFSET. This loads the HL register pair with the address of the first byte of screen memory. HL can now be incremented or decremented and when &BCO5 SCR SET OFFSET. is called, the screen can be made to scroll, with 80 bytes per screen line up in all modes, an increase of 80 on starting offset. The screen scrolls up one character line (eight screen lines) and by increasing HL by two, the screen scrolls left. Decrementing HL has the opposite effect. The OS is kept informed of the offset at all times so even after several scrolls, a locate x,y:print chrs is always executed at the correct screen address. Each scroll routine takes 12 bytes.

The routines are set up for use in mode 1. For use in mode 0 or 2 consult Table 2 and poke these addresses before running these routines.

To use them you must first type in the Basic loader and run the routine. There is then a simple data check and even with a DATA OK message save the loader to tape before calling a routine.

First, try CALL 20000: the screen should scroll left by one space. To get a taste of the speed of these routines try 10 call 20000/20 for f=1 to 20:next/30 goto 10
and run it. Save the code to tape statement at the end of the Loader program.

Table 1

How to use the routines		
CALL	20000	scroll left
,,	20012	scroll right
,,	20024	scroll up
,,	20036	scroll down
,,	20048	blank left
,,	20066	blank right
,,	20084	blank top
,,	20102	blank bottom
,,	20120	box 1 left
,,	20138	box 1 right
,,	20156	box 2 right
,,	20174	box 2 left
,,	20192	box 3 right
,,	20210	box 3 left
POKE		
,,	20004	scroll count left
,,	20016	scroll count right
,,	20028	scroll count up
,,	20040	scroll count down

In use

For your own games you can try omitting the blank out routine so that whatever exits left appears at the right of the screen but one line up or one line down in mode 1. If that's not what you want, it can be corrected with a scroll up or down. You can also have diagonal scroll by poking the scroll count addresses with 82, *ie* if you poke the scroll left, scroll count with 82, and when you call left scroll you will have a right to left diagonal scroll.

The scroll count address can be poked with any number between 1 and 255 and each number has a different effect. If you wish to use the routines in mode 0 or 2 first poke the addresses given in Table 2.

For smooth scrolling in these modes, the scroll counts should be poked with 4 in mode 0 and 1 in mode 2. However, experimenting with different numbers and combinations of scroll can result in some very interesting programs.

Table 2

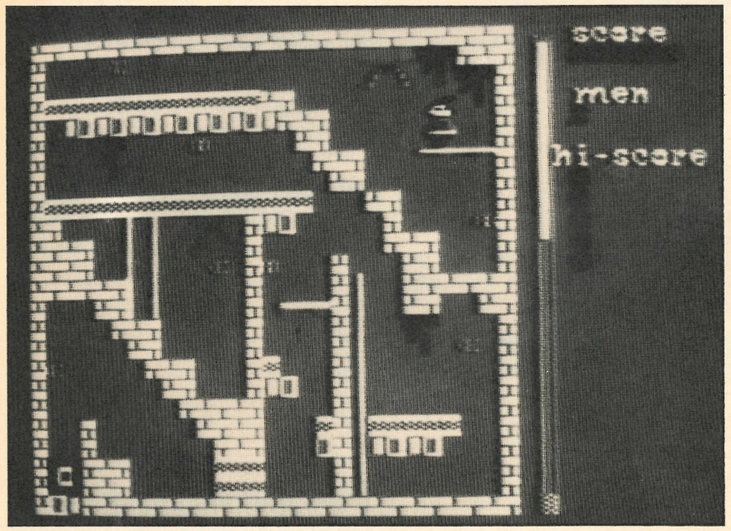
POKE	Mode 1	Mode 2
20073	19	79
20075	,,	,,
20093	,,	,,
20111	,,	,,
20145	,,	,,
20147	,,	,,
20163	,,	,,
20165	,,	,,
20199	,,	,,
20201	,,	,,

Scroll loader

```
10 MEMORY 19999
20 addr=19999
25 c=0
30 FOR inc=1 TO 228
40 READ v
50 POKE addr+inc,v
55 c=c+v
60 NEXT
70 DATA 205,11,188,6,2,35,16,253,205,05,
188,201,205,11,188,06,02,43,16,253,205,0
5,188,201
71 DATA 205,11,188,6,80,35,16,253,205,05
,188,201,205,11,188,06,80,43,16,253,205,
05,188,201
72 DATA 205,153,184,205,44,188,38,00,22,
00,46,00,30,24,205,68,188,201
73 DATA 205,153,184,205,44,188,38,39,22,
39,46,00,30,24,205,68,188,201
74 DATA 205,153,184,205,44,188,38,00,22,
39,46,00,30,00,205,68,188,201
75 DATA 205,153,184,205,44,188,38,00,22,
39,46,24,30,24,205,68,188,201
76 DATA 205,147,187,205,44,188,38,00,22,
00,46,24,30,24,205,68,188,201
77 DATA 205,147,187,205,44,188,38,39,22,
39,46,24,30,24,205,68,188,201
78 DATA 205,147,187,205,44,188,38,39,22,
39,46,23,30,24,205,68,188,201
79 DATA 205,147,187,205,44,188,38,00,22,
00,46,23,30,24,205,68,188,201
80 DATA 205,147,187,205,44,188,38,39,22,
39,46,22,30,24,205,68,188,201
81 DATA 205,147,187,205,44,188,38,00,22,
00,46,22,30,24,205,68,188,201
100 MODE 1:INK 1,0:INK 0,26:PAPER 1:PEN
0:CLS
110 IF c<>23952 THEN PRINT"****CHECK DAT
A FOR MISTAKE****" ELSE PRINT"****DATA O
K****"
111 FOR f= 1 TO 1000:NEXT:LIST
120 ' If you wish to save the code to
  tape use save"code",B,20000,230
   when you want to load the code
      into your own programs use
  10 memory 19999:load "code",20000
199 '*TYPE "RUN 200"AFTER SAVING LOADER*
200 CALL 20000
210 FOR F=1 TO 20:NEXT
230 GOTO 200
```

JOURNEY'S END

If you've survived keying in the first two parts of Tony Crowther's exclusive game, you'll be delighted that this is the last instalment.



Part 11 (cont)

```
128 DATA17,17,17,17,17,17,17,17,136
500 PRINT"[CLEAR]PLEASE WAIT!"
501 FORI=0TO127:R=0:FORJ=0TO7:READA:R=R+
A:POKE16384+I*8+J,A:NEXT
502 READA:IFR<>ATHENPRINT"ERROR IN"I+1:E'
ND
503 NEXT:PRINT"OK. ALL DONE!"
504 LOAD"PART12",8
```

Part 12

```
0 REMPART12:ROO2:WIZARD DEVELOPMENT LTD.
1 DATA17,17,0,0,0,0,0,0,34
2 DATA0,0,0,17,17,17,17,17,85
3 DATA17,17,17,17,17,17,17,17,136
4 DATA17,53,0,0,0,0,0,0,70
5 DATA0,0,0,0,0,0,3,0,3
6 DATA0,0,0,0,0,0,0,0,0
7 DATA0,0,0,0,0,153,144,0,297
8 DATA0,0,153,153,153,153,153,153,918
9 DATA68,153,153,48,9,153,153,153,890
10 DATA0,0,0,0,0,0,68,0,68
11 DATA3,0,0,0,0,0,0,0,3
12 DATA0,0,0,80,68,0,0,0,148
13 DATA0,0,0,0,0,0,0,0,0
14 DATA0,0,68,0,0,50,34,0,152
15 DATA0,48,0,68,0,0,0,0,116
16 DATA68,0,3,0,3,34,34,34,176
17 DATA34,68,0,0,0,0,68,0,170
18 DATA0,0,0,0,68,0,3,34,105
19 DATA34,34,34,0,68,0,0,48,218
20 DATA5,0,68,0,0,0,0,0,73
21 DATA80,34,34,34,3,0,0,0,185
22 DATA68,0,0,0,0,0,0,0,68
23 DATA0,0,0,0,0,0,68,0,68
24 DATA0,0,0,0,48,34,34,34,150
25 DATA0,48,0,0,68,0,0,34,150
26 DATA34,34,34,48,0,0,3,0,153
27 DATA0,34,34,34,34,0,5,0,141
28 DATA0,0,5,0,0,0,0,0,5
29 DATA0,0,0,0,0,0,0,0,0
30 DATA0,0,0,50,34,0,0,0,84
31 DATA0,0,0,0,0,0,0,0,0
32 DATA3,0,0,34,34,34,34,0,139
33 DATA3,0,0,0,0,0,0,0,3
34 DATA0,0,0,0,0,34,34,34,102
35 DATA34,0,0,0,0,48,80,0,162
36 DATA0,0,0,0,0,0,0,34,34
37 DATA68,34,3,0,0,0,0,0,105
38 DATA0,0,0,0,0,0,68,0,68
39 DATA0,0,0,0,0,0,0,0,0
40 DATA0,0,0,34,34,34,34,48,184
41 DATA3,0,0,0,0,34,34,34,105
42 DATA34,0,0,0,3,34,34,34,139
43 DATA34,34,34,17,17,17,17,17,187
44 DATA17,17,17,0,0,0,0,0,51
45 DATA0,0,0,0,17,17,17,17,68
46 DATA17,17,17,17,17,17,17,17,136
47 DATA17,17,16,0,0,0,5,0,55
48 DATA0,0,0,0,0,128,0,1,129
49 DATA16,0,0,0,0,0,0,0,16
50 DATA0,0,0,128,0,1,16,0,145
51 DATA0,0,0,0,0,0,0,0,0
52 DATA0,17,17,129,16,0,48,0,227
53 DATA3,0,0,48,0,3,0,16,70
54 DATA0,129,16,22,102,102,102,102,575
55 DATA102,102,102,102,97,16,0,1,522
56 DATA16,16,68,0,0,0,0,0,100
57 DATA0,0,0,17,17,17,16,0,67
58 DATA68,0,0,0,0,0,0,0,68
59 DATA0,0,0,1,16,0,68,153,238
60 DATA153,153,153,153,153,153,144,0,106
2
61 DATA0,1,24,16,68,0,0,0,109
62 DATA0,0,0,0,0,0,0,1,1
63 DATA16,16,68,0,0,5,0,0,105
64 DATA80,0,5,0,0,81,16,16,198
65 DATA68,144,0,9,0,0,144,0,365
66 DATA9,0,0,145,16,17,17,51,255
67 DATA51,51,51,51,51,51,51,51,408
68 DATA51,49,16,0,0,0,0,0,116
69 DATA0,0,0,0,0,0,0,1,1
70 DATA16,0,0,0,0,0,0,0,16
71 DATA0,5,0,0,0,1,24,16,46
72 DATA0,0,0,0,0,0,0,0,0
73 DATA0,0,0,1,24,25,153,153,356
74 DATA153,137,153,153,152,153,153,136,1
190
75 DATA153,145,24,16,0,0,0,0,338
76 DATA0,0,0,0,0,0,0,1,1
77 DATA24,128,0,0,0,0,0,0,152
78 DATA0,0,0,0,0,81,24,128,233
79 DATA0,0,0,0,0,0,0,0,0
80 DATA0,0,0,1,17,17,0,0,35
81 DATA0,0,0,0,0,0,0,0,0
82 DATA0,1,16,8,0,0,0,0,25
83 DATA0,0,0,0,0,0,0,1,1
84 DATA16,8,8,136,136,136,136,136,712
85 DATA136,136,136,136,136,129,17,17,843
86 DATA17,49,49,49,49,49,49,49,360
87 DATA49,49,49,49,0,0,0,0,196
88 DATA0,0,0,0,0,17,17,17,51
89 DATA17,17,17,17,17,17,17,17,136
90 DATA17,17,17,16,0,0,0,0,67
91 DATA0,0,0,0,0,0,0,0,0
92 DATA1,16,0,0,0,0,0,0,17
93 DATA0,0,0,0,0,0,1,16,17
94 DATA0,0,153,153,153,153,153,153,918
95 DATA153,153,0,0,1,16,0,0,323
96 DATA68,51,52,51,67,51,67,68,475
97 DATA0,0,1,16,0,0,68,68,153
98 DATA68,68,68,68,68,68,0,0,408
99 DATA1,16,0,68,68,68,68,68,357
100 DATA68,68,68,68,68,68,1,16,425
101 DATA68,68,68,68,68,68,68,68,544
102 DATA68,68,68,68,1,16,68,68,425
103 DATA68,68,68,68,68,68,68,68,544
104 DATA68,68,1,16,68,69,68,68,426
105 DATA84,68,68,68,68,68,67,51,542
106 DATA1,16,68,68,68,68,68,68,425
107 DATA68,68,68,68,68,68,1,16,425
108 DATA68,68,68,68,68,68,68,68,544
109 DATA68,68,68,68,1,16,51,51,391
110 DATA68,68,68,68,68,68,68,64,540
111 DATA0,68,1,16,68,68,68,68,357
112 DATA68,68,68,69,68,64,0,68,473
113 DATA1,16,68,68,68,68,68,68,425
114 DATA68,68,68,68,68,68,1,16,425
115 DATA68,80,0,68,68,68,68,68,488
116 DATA68,68,68,68,1,16,68,68,425
117 DATA68,68,51,51,51,67,51,52,459
118 DATA68,68,1,16,68,68,68,68,425
119 DATA80,0,68,68,68,68,51,68,471
120 DATA1,21,68,0,4,68,0,0,162
121 DATA68,68,68,68,80,68,1,16,437
122 DATA0,0,4,68,68,68,68,68,344
123 DATA68,68,0,68,1,24,128,68,425
124 DATA68,68,68,68,68,68,68,67,543
125 DATA68,68,1,16,0,68,68,68,357
126 DATA68,68,68,68,68,68,68,68,544
127 DATA1,16,0,0,0,0,0,0,17
128 DATA48,0,0,0,0,0,0,1,17,66
500 PRINT"[CLEARJPLEASE WAIT!"
501 FORI=0TO127:R=0:FORJ=0TO7:READA:R=R+
A:POKE17408+I*8+J,A:NEXT
502 READA:IFR<>ATHENPRINT"ERROR IN"I+1:E
ND
503 NEXT:PRINT"OK. ALL DONE!"
504 LOAD"PART13",8

READY.
```

Part 13

```
0 REMPART13:ROO3:WIZARD DEVELOPMENT LTD.
1 DATA119,119,119,119,119,119,22,102,838
2 DATA102,102,102,102,17,0,0,0,425
3 DATA0,0,0,0,0,0,17,17,34
4 DATA17,17,17,17,17,17,17,17,136
5 DATA17,17,17,17,16,0,0,0,84
6 DATA0,0,0,0,0,0,0,0,0
7 DATA0,1,16,5,0,0,0,0,22
8 DATA0,0,0,0,0,0,0,1,1
9 DATA16,0,0,0,0,0,0,0,16
10 DATA0,0,0,0,0,1,16,0,17
11 DATA0,0,0,0,0,0,0,0,0
12 DATA0,0,0,1,16,0,0,0,17
13 DATA0,0,0,0,0,0,0,0,0
14 DATA0,1,34,34,0,0,0,0,69
15 DATA0,0,0,0,0,0,153,145,298
16 DATA24,136,0,131,136,136,136,136,835
17 DATA136,136,56,0,136,129,24,88,705
18 DATA0,136,136,56,136,136,131,136,867
19 DATA136,0,133,129,24,136,0,136,694
20 DATA136,136,136,136,136,136,136,0,952
21 DATA136,129,24,136,0,136,136,136,833
22 DATA131,56,136,136,136,0,136,129,860
23 DATA24,136,0,136,136,136,136,136,840
24 DATA136,136,136,0,136,129,24,136,833
25 DATA0,136,136,136,136,136,136,136,952
26 DATA136,0,136,129,24,136,0,136,697
27 DATA136,88,136,136,133,136,136,0,901
28 DATA136,129,24,136,0,136,136,136,833
29 DATA136,136,136,136,136,0,136,129,945
30 DATA24,136,0,136,136,136,136,136,840
31 DATA136,136,136,0,136,129,24,131,828
32 DATA0,136,136,136,136,136,136,136,952
33 DATA136,0,56,129,19,48,0,102,490
34 DATA102,102,102,119,119,119,119,0,782
35 DATA3,129,16,0,0,0,0,0,148
36 DATA0,0,0,0,0,0,0,1,1
37 DATA21,0,0,0,0,0,0,0,21
38 DATA0,0,0,0,0,81,16,0,97
39 DATA0,0,0,0,0,0,0,0,0
40 DATA0,0,0,1,16,0,0,0,17
41 DATA0,0,0,0,0,0,0,0,0
42 DATA0,1,16,0,51,0,0,0,68
43 DATA0,0,0,0,0,51,0,1,52
44 DATA17,17,17,17,17,17,17,17,136
45 DATA17,17,17,17,17,17,0,0,102
46 DATA0,0,0,0,0,0,17,17
47 DATA17,17,17,17,17,17,17,17,136
48 DATA17,17,17,17,17,16,80,0,181
49 DATA0,0,0,0,0,0,0,0,0
50 DATA0,0,1,16,0,0,0,0,17
51 DATA0,0,0,0,0,0,0,0,0
52 DATA1,16,0,0,0,0,0,0,17
53 DATA0,0,0,0,0,0,1,16,17
54 DATA34,0,34,0,34,0,34,0,136
55 DATA34,0,34,0,1,16,0,0,85
56 DATA0,0,0,0,0,0,0,0,0
57 DATA0,0,1,16,0,0,0,0,17
58 DATA0,0,0,5,0,0,9,153,167
59 DATA145,16,0,34,0,0,34,0,229
60 DATA0,0,0,0,0,0,1,16,17
61 DATA0,0,0,0,0,0,0,0,0
62 DATA0,0,0,0,1,16,80,0,97
63 DATA0,0,0,0,0,34,0,0,34
64 DATA0,5,1,16,0,0,0,34,56
65 DATA0,0,0,0,0,0,0,0,0
66 DATA1,16,34,0,0,0,0,0,51
67 DATA0,0,0,34,0,0,1,16,51
68 DATA0,0,0,0,0,80,0,0,80
69 DATA0,0,0,0,1,16,0,0,17
70 DATA0,0,0,0,0,0,0,0,0
71 DATA0,34,1,16,80,0,0,34,165
72 DATA0,0,0,0,0,0,0,0,0
73 DATA1,16,0,0,0,0,0,0,17
74 DATA0,34,5,0,0,34,1,16,90
75 DATA0,0,0,0,0,0,0,0,0
76 DATA0,0,0,0,1,16,0,0,17
77 DATA34,0,0,34,0,0,0,0,68
78 DATA0,34,1,16,0,0,0,0,51
79 DATA0,0,0,0,0,0,0,0,0
80 DATA1,16,34,0,0,0,0,0,51
81 DATA0,0,34,0,0,34,1,16,85
82 DATA0,0,0,0,0,0,0,0,0
83 DATA0,0,0,0,1,16,0,51,68
84 DATA0,0,0,0,0,0,0,0,0
85 DATA0,0,1,16,0,51,51,51,170
86 DATA51,51,51,51,51,51,51,51,408
87 DATA49,17,17,17,17,17,17,17,168
88 DATA17,17,17,17,17,17,17,0,119
89 DATA0,0,0,0,0,0,0,0,0
90 DATA17,17,17,17,17,17,17,17,136
91 DATA17,17,17,17,17,17,16,0,118
92 DATA0,5,0,0,0,0,0,0,5
93 DATA0,0,0,1,16,0,0,0,17
94 DATA0,0,0,0,0,0,0,0,0
95 DATA0,1,16,0,0,0,0,0,17
96 DATA0,0,0,0,0,0,0,1,1
97 DATA16,0,0,3,0,0,0,0,19
98 DATA48,0,0,1,0,1,16,102,168
99 DATA102,102,102,102,102,102,102,102,8
16
100 DATA102,97,0,1,16,0,0,0,216
101 DATA0,80,0,0,0,0,0,0,89
102 DATA153,145,16,0,0,0,0,48,362
103 DATA0,0,0,48,0,0,0,1,49
104 DATA23,119,119,119,119,119,119,119,8
56
105 DATA119,119,119,119,119,1,16,0,612
106 DATA0,0,0,0,5,0,0,0,5
107 DATA0,0,0,1,16,0,48,0,65
108 DATA0,0,3,0,0,0,0,48,51
109 DATA0,1,16,102,102,102,102,102,527
110 DATA102,102,102,102,102,102,102,97,8
11
111 DATA16,0,0,5,0,0,0,0,21
112 DATA80,0,0,0,0,1,16,0,97
113 DATA0,3,0,0,0,0,48,0,51
114 DATA0,0,0,1,23,119,119,119,381
115 DATA119,119,119,119,119,119,119,119,
952
116 DATA119,1,16,0,0,0,0,80,216
117 DATA0,0,0,5,0,0,0,1,6
118 DATA16,0,0,0,0,48,0,0,64
119 DATA0,3,0,0,0,1,16,102,122
120 DATA102,102,102,102,102,102,102,102,
816
121 DATA102,102,102,97,16,0,0,0,419
122 DATA0,0,0,0,0,0,0,0,0
123 DATA0,1,23,119,119,119,119,119,619
124 DATA119,0,0,0,0,0,0,1,120
125 DATA16,6,102,102,102,102,102,102,634
126 DATA102,102,102,102,102,97,16,1,624
127 DATA17,17,17,17,17,17,17,17,136
128 DATA17,17,17,16,1,68,68,221
500 PRINT"[CLEAR]PLEASE WAIT!"
501 FORI=0TO127:R=0:FORJ=0TO7:READA:R=R+
A:POKE18432+I*8+J,A:NEXT
502 READA:IFR<>ATHENPRINT"ERROR IN"I+1:E
ND
503 NEXT:PRINT"OK. ALL DONE!"
504 LOAD"PART14",8

READY.
```

Part 14

```
0 REMPART14:ROO4:WIZARD DEVELOPMENT LTD.
1 DATA68,68,68,68,68,68,68,68,544
2 DATA68,17,17,17,68,68,68,68,391
3 DATA68,68,68,68,68,68,68,17,493
4 DATA0,0,0,0,0,0,0,0,0
5 DATA0,17,17,17,17,17,17,17,119
6 DATA17,17,17,17,17,17,17,16,135
7 DATA0,0,0,0,0,0,0,0,0
8 DATA0,0,0,0,1,21,0,0,22
9 DATA0,0,0,0,0,0,0,0,0
10 DATA0,0,1,16,0,0,0,0,17
11 DATA0,0,0,0,0,0,0,0,0
12 DATA1,16,0,0,0,0,0,0,17
13 DATA0,0,0,0,0,0,1,16,17
14 DATA0,0,0,0,0,0,0,0,0
15 DATA0,0,0,0,1,25,144,0,170
16 DATA9,144,0,9,144,0,9,0,315
17 DATA0,17,17,21,0,0,0,0,55
18 DATA0,0,0,0,144,0,1,17,162
19 DATA17,16,0,0,0,0,0,0,33
20 DATA0,9,0,0,17,17,17,25,85
21 DATA144,0,9,144,0,9,153,144,603
22 DATA0,1,17,17,17,21,0,0,73
23 DATA0,0,0,0,0,0,0,17,17
24 DATA17,17,17,16,0,0,0,0,67
25 DATA0,0,0,0,1,17,17,17,52
26 DATA17,25,144,0,9,144,0,9,348
27 DATA153,0,17,17,17,17,17,21,259
28 DATA0,0,0,0,0,0,0,1,1
29 DATA17,17,17,17,17,16,0,0,101
30 DATA0,0,0,0,0,17,17,17,51
31 DATA17,17,17,25,144,0,9,144,373
32 DATA0,9,1,17,17,17,17,17,95
33 DATA17,21,0,0,0,0,0,0,38
34 DATA17,17,17,17,17,17,17,16,135
35 DATA0,0,0,0,0,1,17,17,35
36 DATA17,17,17,17,17,25,144,0,254
37 DATA9,144,0,17,17,17,17,17,238
38 DATA17,17,17,16,0,0,0,0,67
39 DATA1,17,17,17,17,17,17,17,120
40 DATA17,16,0,0,0,0,17,17,67
41 DATA17,17,17,17,17,17,17,16,135
42 DATA0,0,0,0,0,0,0,0,0
43 DATA0,0,0,85,1,16,0,0,102
44 DATA0,0,0,0,0,0,0,0,0
45 DATA0,0,1,17,17,17,17,17,86
46 DATA17,17,17,17,17,17,17,17,136
47 DATA17,0,0,0,0,0,0,0,17
48 DATA0,0,0,0,0,0,0,0,0
500 PRINT"[CLEARJPLEASE WAIT!"
501 FORI=0TO47:R=0:FORJ=0TO7:READA:R=R+A
:POKE19456+I*8+J,A:NEXT
502 READA:IFR<>ATHENPRINT"ERROR IN"I+1:E
ND
503 NEXT:PRINT"OK. ALL DONE!"
504 LOAD"PART15",8

READY.
```

Part 15

```
0 REMPART15:JUMP:WIZARD DEVELOPMENT LTD.
1 DATA0,1,0,1,1,1,0,1,5
2 DATA1,1,1,1,1,1,1,1,8
3 DATA1,1,1,1,1,1,1,1,8
4 DATA1,1,1,1,1,1,1,1,8
5 DATA1,1,1,1,1,1,1,0,7
6 DATA1,0,1,0,1,255,1,255,514
7 DATA1,255,1,255,1,255,1,255,1024
8 DATA1,255,1,255,1,255,1,255,1024
9 DATA1,255,1,255,1,255,1,255,1024
10 DATA1,255,1,255,0,255,1,255,1023
11 DATA1,255,0,255,1,255,1,255,1023
12 DATA0,255,1,255,255,0,255,0,1021
13 DATA255,0,255,0,255,0,255,0,1020
14 DATA255,0,255,0,255,0,255,0,1020
15 DATA255,0,255,0,255,0,255,0,1020
16 DATA254,255,0,255,0,255,0,255,1274
17 DATA0,255,0,255,0,255,0,255,1020
18 DATA0,255,0,255,0,255,0,255,1020
19 DATA0,255,0,255,0,255,0,255,1020
20 DATA0,255,0,255,0,255,0,255,1020
21 DATA0,255,0,255,0,255,0,255,1020
22 DATA0,255,0,255,0,255,0,255,1020
23 DATA0,255,0,255,0,255,0,255,1020
500 PRINT"[CLEAR]PLEASE WAIT!"
501 FORI=0TO22:R=0:FORJ=0TO7:READA:R=R+A
:POKE33800+I*8+J,A:NEXT
502 READA:IFR<>ATHENPRINT"ERROR IN"I+1:E
ND
503 NEXT:PRINT"OK. ALL DONE!"
504 LOAD"PART16",8

READY.
```

Part 16

```
0 POKE53248+24,29:POKE53269,0:GOSUB400
10 POKE53280,6:POKE53281,8:PRINT"[CLEAR]
":POKE53281,6
11 POKE831,0:POKE54296,15
12 PRINT"[HOME][DOWN]"TAB(32)"[WHITE]SCO
RE"
13 PRINTTAB(32)"[BLACK]000000":GOSUB230
14 ME=3:P=1
15 POKE53250,40:POKE53251,226
16 PRINT"[HOME][DOWN][DOWN][DOWN][DOWN]"
TAB(32)"[WHITE]MJEN":PRINTTAB(32)"[BLACK
]0"
17 SYS50420
18 SYS49349
20 REM START
30 POKE53248+22,24
40 POKE53282,12
50 POKE53283,1:POKE49865,0
60 SYS49152:POKE1256,ME+47
80 POKE53285,0:SYS49500
90 POKE53286,1
100 POKE53287,10:POKE50461,0
110 SYS50790:POKE53278,0
120 SYS50515
130 A=PEEK(50461):IFA=255THEN200
135 GOSUB220:IF(E/10000)=>PTHENME=ME+1:P
=P+1
140 ME=ME-1:IFME=0THEN280
150 GOTO20
200 SYS51024:LE=PEEK(831)+1:IFLE>9THENLE
=0
210 POKE831,LE:GOTO20
220 E=0:FORI=0TO5:E=E*10:E=E+PEEK(1136+I
)-48:NEXT:RETURN
230 FORI=0TO5:FORJ=0TO3:IFA(J+1)>A(J)THE
NT=A(J):A(J)=A(J+1):A(J+1)=T
240 NEXT:NEXT
250 PRINT"[HOME][DOWN][DOWN][DOWN][DOWN]
[DOWN][DOWN][DOWN]"TAB(31)"[WHITE]HI-SCO
RE[BLACK]"
260 FORI=0TO4:PRINTTAB(31)A(I):NEXT
270 RETURN
280 IFE>A(4)THENA(4)=E
290 POKE53281,8:PRINT"[CLEAR]":POKE53281
,6
300 POKE53269,3:POKE53250,168:POKE53251,
204:SYS51093
310 PRINT"[WHITE][DOWN][DOWN][DOWN][RIGH
T][RIGHT][RIGHT][RIGHT][RIGHT][RIGHT][RI
GHT]YOUR SCORE IS "E:PRINT"[RIGHT][RIGHT
][RIGHT][RIGHT][RIGHT][RIGHT]#"
320 POKE53282,1:PRINT"[DOWN][DOWN][DOWN]
[DOWN][DOWN][DOWN][DOWN][DOWN][DOWN][DOW
N][DOWN][DOWN][DOWN][DOWN][DOWN][DOWN]"T
AB(18)"[c 1][s A][s B][s A][s B][DOWN][L
EFT][LEFT][LEFT][LEFT][s A][s B][s A][s
B][DOWN][LEFT][LEFT][LEFT][LEFT][s A][s
B][s A][s B][HOME]
330 POKE53248,168:POKE53249,100:POKE2040
,144:R=1324:G=100:POKE2041,128
340 IF(GAND7)=2THENPOKER,97:R=R+40
350 G=G+2:POKE53249,G:IFG<210THEN340
360 GOTO0
400 PRINT"[CLEAR]":POKE53280,0:POKE53281
,0
410 PRINT"[DOWN][WHITE]W!ELCOMJE TO T.C
MJINE BY A.CROW!THER"
420 PRINT"                    #
430 PRINT"YOUR MJISSION IS TO CLEAR ALL
THE MJINES";
440 PRINT"#"
450 PRINT"OUT. YOU HAVE THREE LIVES TO P
LAY W!ITH"
460 PRINT"     #                         ^
  #
470 PRINT"YOU GET 200 POINTS FOR EACH LE
TTER"
480 PRINT"#   [      ^
490 PRINT"PLUS BONUS POINTS
500 PRINT"^           ^
510 PRINT"EXTRA MJAN EVERY 10,000 POINTS
520 PRINT"                #         ^
530 PRINT"USE 'Z' AND 'X' AND 'SHIFT'
540 PRINT"[DOWN]OR JOYSTICK PORT 2"
550 PRINT"   \ #      ^
560 PRINT"[DOWN][DOWN]      PRESS SCACE B
AR TO PLAY GAMJE"
570 PRINT"    ^                       ^  # [
580 GETA$:IFA$<>" "THEN580
590 RETURN

READY.
```

Part 17

```
0 POKE53280,0:POKE53281,0
1 POKE53248+24,29
2 PRINT"[CLEARJSAVER : THIS W!ILL SAVE T
HE PROGRAMJ
3 PRINT"                          ^  [
4 PRINT"TO DISC : PLEASE W!AIT "
5 PRINT"        ^"
6 N1$="@:DATA1":N2$="@:DATA2"
7 DIV=8:PRINT"SAVING DATA1":PRINT"     [
8 POKE250,0:POKE251,32:POKE780,1:POKE781
,DIV:POKE782,1
9 SYS65466:FORI=1TO7:POKE839+I,ASC(MID$(
N1$,I,1)):NEXT
10 POKE780,7:POKE781,72:POKE782,3:SYS654
69
11 POKE780,250:POKE781,0:POKE782,153:SYS
65496:PRINT"SAVING DATA2":PRINT"     [^
12 POKE250,0:POKE251,192:POKE780,1:POKE7
81,DIV:POKE782,1
13 SYS65466:FORI=1TO7:POKE839+I,ASC(MID$
(N2$,I,1)):NEXT
14 POKE780,7:POKE781,72:POKE782,3:SYS654
69
15 POKE780,250:POKE781,0:POKE782,207:SYS
65496
16 PRINT"ALL DONE."

READY.
```

Part 18

```
1 A=A+1
2 IFA=1THENLOAD"DATA1",8,1
3 IFA=2THENLOAD"DATA2",8,1
4 POKE56,32:PRINT"[CLEARJLOAD"CHR$(34)"P
ART16"CHR$(34)",8
5 POKE198,2:POKE631,19:POKE632,131:NEW

READY.
```

Crowther correction

Gremlins crept into the end of Part four of our Tony Crowther listing in issue 97. The following lines should replace the ones in the listing.

501 FOR I=0 TO 70:R=0: FOR J=0 TO 7: READ A: R=R+A: POKE 9216+ I*8+J,A: NEXT

502 READ A: IF R<>A THEN PRINT "ERROR IN" I+1: END

503 NEXT: PRINT "OK. ALL DONE!"

504 LOAD "PART5",8

sinclair

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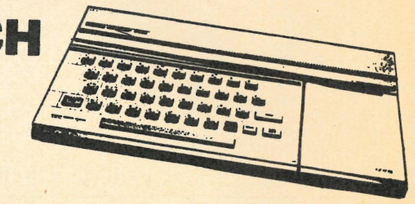

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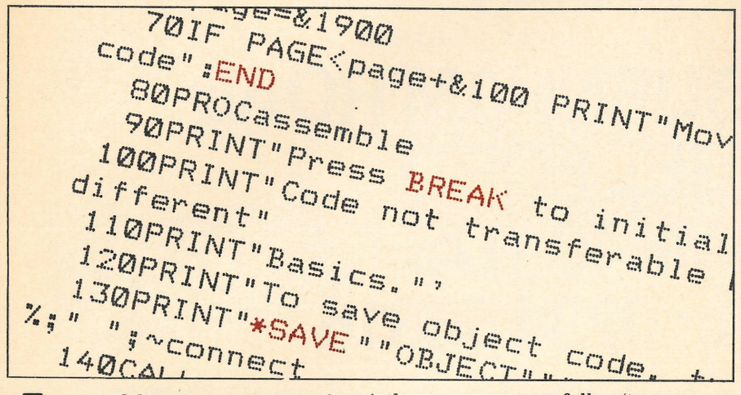
No need to spend eye-watering, carpet-chewing hours debugging a program. Try Shingo Sugiura's machine code utility.



Anyone debugging programs often needs to find the occurrence of a particular variable or a particular string. The obvious way is to list the program and look through it line by line while pressing the SHIFT-CTRL combination. However, this method can be pretty frustrating. This short machine code routine helps you.

First, you must set page to &1A00 (or &F00 if you have a tape-based machine). This is necessary because the object code is assembled at &1900 and would overwrite the source code. Type in the program carefully (tape users, change line 60 to PAGE=&E00). Save the program before you run it.

If all is well, it will print out instructions for you to save the object code. Object code saved in this way may be ★RUN at the beginning of a hacking session but once it's loaded, Break must be pressed to initialise the routine. This automatically moves up the value of PAGE so the machine code routine won't be corrupted by your Basic program.

To use the routine, type: ★LINE A$ <RETURN> where A$ is the string you want to search for. As soon as you press Return, the routine checks that there is a basic program and then goes through each line of the program checking for the occurrence of A$. Every time there's a match, that line is listed.

The search process is extremely quick so you may miss some of the lines as they scroll off the screen. To prevent this, press CTRL and SHIFT simultaneously. The problem with this utility is that you lose one page of memory (0.25 K) but I'm sure you'll find that a small sacrifice.

This utility intercepts Break. This is done so that PAGE is incremented by two pages whenever the Break key (or even CTRL-BREAK) is pressed. Also, the user vector is reset to point to the actual search routine so that ★LINE invokes the utility. If you want to reinitialise the machine, type ★FX247 <RETURN> and press Break (or switch the machine off).

How it works

There are two main difficulties in writing a basic search routine. First, it must be fast so that means writing in machine code, which is more difficult. Second, because Basic tokenises keywords to speed up programs and save space), to find a keyword such as GOTO, you can't just search sequentially for characters G, O, T, and O. Instead, you must find the token for that keyword (in this case, &E5) and search for that instead.

That may sound easy until you realise that keywords may be abbreviated and the whole routine must be as small as possible. I decided to call the tokenising routine in the Basic routine. The disadvantage is that the object code produced is incompatible with different Basics. However, this should not be too much of a problem (surely, there aren't many people who use Basic I and Basic II at the same time?).

Listing

```
   10REM String Search
   20REM By Shingo Sugiura
   30REM (C) November 1984
   40
   50MODE7
   60page=&1900
   70IF PAGE<page+&100 PRINT"Move source
 code":END
   80PROCassemble
   90PRINT"Press BREAK to initialise"''
  100PRINT"Code not transferable between
 different"
  110PRINT"Basics."'
  120PRINT"To save object code, type:"'
  130PRINT"*SAVE""OBJECT""";~page;" ";~P
%;" ";~connect
  140CALLconnect
  150END
  160DEFPROCassemble
  170PROCvars
  180FOR pass=0 TO 2 STEP2:P%=page
  190[OPT pass
  200.break
  210     BCC first
  220     LDA#FNlo(find)
  230     STA &200
  240     LDA#FNhi(find)
  250     STA &201
  260     LDX#FNhi(page+&100)
  270     LDY#0
  280     LDA#180
  290     JMP osbyte
  300.first
  310     RTS
  320.find
  330     CMP#0
  340     BNE ok
  350     JMP bad
  360.ok
  370     TYA:PHA
  380     JSR settop
  390     PLA:TAY
  400     STX address
  410     STY address+1
  420     LDY#&FF
```


Listing (cont)

```
  430.copy_loop
  440     INY
  450     LDA(address),Y
  460     STA buffer,Y
  470     CMP#&D
  480     BNE copy_loop
  490.search
  500     LDA #FNlo(buffer)
  510     STA &37
  520     LDA #FNhi(buffer)
  530     STA &38
  540     JSR tokenise
  550     LDY #0
  560.l_loop
  570     LDA buffer,Y
  580     CMP#&D
  590     BEQ found
  600     INY
  610     BNE l_loop
  620.found
  630     STY size
  640     LDA #0
  650     STA address
  660     LDA &18
  670     STA address+1
  680.line
  690     LDY #1
  700     LDA (address),Y
  710     BMI eop
  720     INY:INY
  730     LDA (address),Y
  740     STA length
  750     CMP size:BCC next
  760.s_loop
  770     INY:CPY length
  780     BEQ next
  790     LDA (address),Y
  800     CMP buffer
  810     BNE s_loop
  820     JSR check
  830     JMP s_loop
  840.next
  850     CLC
  860     LDA address
  870     ADC length
  880     STA address
  890     LDA address+1
  900     ADC #0
  910     STA address+1
  920     BCC line
  930.eop
  940     RTS
  950.check
  960     LDX #0:TYA:PHA
  970.c_loop
  980     LDA (address),Y
  990     CMP buffer,X
 1000     BNE no_match
 1010     INX
 1020     CPX size:BEQ match
 1030     INY
 1040     CPY length
 1050     BEQ no_match
 1060     BNE c_loop
 1070.match
 1080     JSR inform
 1090     PLA
 1100     LDY length:DEY
 1110     RTS
 1120.no_match
 1130     PLA:TAY
 1140     RTS
 1150.inform
 1160     LDY #1
 1170     LDA (address),Y
 1180     STA &2B
 1190     INY:LDA (address),Y
 1200     STA &2A
 1210     JSR plnum
 1220     LDY #3
 1230.list
 1240     INY
 1250     LDA (address),Y
 1260     CMP #&D:BEQ eol
 1270     CMP #&8D
 1280     BNE not_line
 1290     JSR lineno
 1300     BNE list
 1310.not_line
 1320     JSR ptoken
 1330     BNE list
 1340.eol JMP osasci
 1350.lineno
 1360     INY
 1370     LDA (address),Y
 1380     ASL A:ASL A
 1390     TAX:AND #&C0
 1400     INY
 1410     EOR (address),Y
 1420     STA &2A
 1430     TXA
 1440     ASL A:ASL A
 1450     INY
 1460     EOR (address),Y
 1470     STA &2B
 1480     JMP pdec
 1490.connect
 1500     LDA#&4C
 1510     STA &287
 1520     LDA#FNlo(break)
 1530     STA &288
 1540     LDA#FNhi(break)
 1550     STA &289
 1560     RTS
 1570]NEXT
 1580ENDPROC
 1590DEFPROCvars
 1600oswrch=&FFEE:osasci=&FFE3:osrdch=&F
FE0:osbyte=&FFF4
 1610address=&70:size=&72:length=&73
 1620buffer=&700
 1630IF ?&8015=ASC"1" PROCconst1 ELSE PR
OCconst2
 1640ENDPROC
 1650DEFPROCconst1
 1660getlno=&97AE:tokenise=&88D3
 1670ptoken=&B53A:pdec=&98F1
 1680plnum=&98F5:settop=&BE88
 1690bad=&E310
 1700ENDPROC
 1710DEFPROCconst2
 1720getlno=&97DF:tokenise=&8951
 1730ptoken=&B50E:pdec=&991F
 1740plnum=&9923:settop=&BE6F
 1750bad=&E310
 1760ENDPROC
 1770DEFFNequb(number)
 1780?P%=number:P%=P%+1
 1790=pass
 1800DEFFNequs(string$)
 1810$P%=string$:P%=P%+LEN string$
 1820=pass
 1830DEFFNlo(number)=number MOD 256
 1840DEFFNhi(number)=number DIV 256
```

CHANGE OF STYLE

The Tandy M1000 is an affordable IBM compatible that offers you not much more for quite a bit less. Geof Wheelwright gives the Texan company's first shot at IBMability his vote.

New direction: Tandy takes the IBM trail.

The M1000, launched at the *Which Computer?* Show, is part of a concerted effort on Tandy's part to change its image — even the old, comfortable appellation 'Model' has been dropped.

Although it's getting hard to be excited about the release of yet another IBM compatible, Tandy is hoping that the extra features added to the 1000 — along with the low price — might just make people stand up and take notice; and with its impressive specifications, (under £1,100, colour grapics, printer/joystick interfaces, 90-key keyboard, 128K RAM, good bundled software, three IBM PC compatible expansion slots, PC software compatibility), Tandy has an excellent chance of succeeding.

First impressions

The 1000 covers less desktop than the PC or most of its compatibles, and displays little of the idiosyncratic styling of previous Tandy ranges. The price (£1,099 for the 128K, single-drive model without screen) also makes an attractive first impression, as it beats any other disk-based fully IBM compatible (with the possible exception of the Advance, which costs just under £1,300 for the dual-drive model with a built-in RS232 connector). It also has impressive graphics built into the system — which many cut-price IBMibles don't include in the base price.

The 1000 has a rugged casing, with none of the thin-skinned feel, criticised in the similarly priced Advance 86b. Perhaps the only weak point in the 1000's construction is the keyboard, which has a slight 'plastic' feel to it and less 'bounce' than I'd have liked.

The M1000 uses exactly the same keyboard as the Tandy 2000, the larger, faster MSDOS machine the company released last year. The function keys have been moved from the left-hand side of the keyboard to above the numbers along the top line of the keyboard. It also adds two keys, giving you a total of 12 function keys.

This top-side function key layout shortens the keyboard — which I've always considered somewhat unwieldy — and reduces the 'footprint' of the system. The total of seven keys over those on the standard IBM PC keyboard may cause inconsistencies in the way the 1000 handles some keyboard routines in certain programs, although I couldn't find any in the time that I used the machine.

The keyboard doesn't wholly toe the IBMible line: the function keys are across the top, rather than down the side.

Documentation

The system comes with a 140-page tutorial, an 18-page quick reference guide to the bundled Deskmate software, an 80-page tutorial for Deskmate, and a 78-page Basic reference guide. But anyone familiar with the IBM PC won't need to study them too hard.

In use

The proof of an IBM compatible is in the running of IBM PC programs. With this in mind, I sat myself down with two boxes worth of my favourtie IBM programs and booted up.

The first thing I noticed is that the copyright message credited 'Phoenix Compatibility Corp' with writing the BIOS (a later discusson with Microsoft in its Seattle offices revealed that Phoenix Software offers a full software service to IBM compatible manufacturers, offering them a money-back guarantee that they will provide a non-litigious IBM compatible BIOS that will run IBM software. If IBM successfully sues any manufacturer using a Phoenix-designed BIOS for ROM infringment, Phoenix will pay the costs).

After booting up good old MSDOS 2.11 and getting the familiar A> prompt, I whipped out my *Wordstar* disk, and challenged the Model 1000 to run it. The familiar *Wordstar* menu darted to the screen, and then accepted all the usual commands.

Then on to *Lotus 1-2-3*, which again did its bit in the way you would expect: a more ambitious test than *Wordstar*, as *Lotus 1-2-3* uses BIOS and ROM calls to accomplish its magic. Although I didn't have a copy of *Symphony*, it should run, as it uses much the same kind of calls and protection schemes as *1-2-3*.

Memory is expandable up to 640K (256K on the main board, and 384K on an expansion card), and thus the full power of such integrated packages should be accessible. The final software compatibility test was the infamous Microsoft *Flight Simulator*, which again ran without a hitch.

Tandy promises the machines will hold most standard expansion cards for the PC. In fact, Tandy is expecting PC and other compatible users to be among the customers for the Tandy-built expansion cards the company is planning for the 1000. The one other compatibility issue worth exploring is that of the PCjr. It may not seem too important in the UK — where the IBM has not seen fit to unleash its home computer — but the Tandy 1000 is about as compatibile with the PC jr as it was with the PC.

The 1000 will run a large number of the disk-based programs for the PC jr, as it has the same built-in graphics capabilities, joystick and light pen ports. Not only does this expand the potential software base of the 1000, but it also means a number of very good games and entertainment programs will now be made accessible in the UK.

Storage

Storage for the base price 1000 is provided by a 360K 5.25in floppy. A second floppy is available for an additional £249. The disks worked quietly and effectively, and the large, red 'in use' lights on the drives make them easier to see than the smaller ones on the PC and some other compatibles.

Expansion

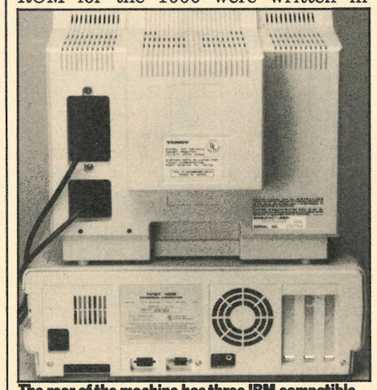
Tandy is offering a hard disk controller for the 1000 for a mere £289, but isn't saying much it's going to charge for the hard disk itself. Luckily, the existence of three IBM compatible expansion slots on the machine's main board means that you should be able to hook up most IBM PC hard disk system to the 1000 (although if you want an internal hard disk, you'll have to keep in mind that the 1000 uses half-height drives, and a standard size 5.25in hard disk will not necessarily fit).

As you only have three expansion slots on the 1000, you'll have to plan carefully how you use them. For example, although Tandy offers an RS232 board for £89, it probably isn't worth getting by itself. Your best bet would be a multi-function card that includes memory expansion, RS232C interface, real-time clock/ calendar and RAM disk software.

This would take up only one of your three expansion slots, leaving the other two free for, say, a hard disk interface and a Hercules graphics card (you don't have to worry about where to put a parallel printer interface, colour graphics interface, joystick interface or light pen interface — they all come standard with the machine).

Software

As mentioned earlier, the BIOS and ROM for the 1000 were written in conjunction with Phoenix software — with all the compatibility guarantee which that approach offers. The operating system, MSDOS 2.11, and the Microsoft Basic included with the machine are, of course, licensed from Microsoft and offer all the regular facilities you have come to expect in both the operating system and the programming language.



The rear of the machine has three IBM compatible expansion slots.

I tried some IBM Basic programs and they ran quite happily under the 1000's Microsoft Basic — so you should even be able to type in IBM listings with no problem.

The applications software is perhaps the most unexpected 'plus' in the Tandy 1000 package. It's called Deskmate, and comprises: Text (a simple word processor much like the one included with the Model 100 portable computer with commands added for pagination, margin settings, headers, footers and a search/replace facility); Worksheet (a 99×99 row/column spreadsheet which allows most common formulae and functions, and references the cells by row and colùmn number — R1C1 as opposed to A1 for the top left-hand corner); Filer (a limited database, mainly designed for keeping addresses or small inventory files); Telecom (a fully functioning telecommunications program with all the capabilities of the Model 100 version plus a few more); Calendar (a daily appointment calendar which automatically uses the time and date information from MSDOS to pull a 'daybook' from disk — it also has an 'alarm' function to remind you of appointments); and Mail (an electronic mail program for transferring data between linked Tandy 1000s).

All the programs are function key driven, and as far as possible the same function keys do the same thing in each, making them easy to use and to learn; so, as with the Model 100, you can begin to do something useful with the Tandy 1000 from the moment you unpack the Deskmate software.

Verdict

If you're looking for a cheap IBM compatible that will be well-supported and expandable, then the Tandy 1000 has got to figure high in your list of possibles. While it doesn't have too many hardware advantages over other compatibles, it has about the most immediately useful bundled software you're likely to see on an IBMible. Deskmate gives the 1000 an edge over machines such as the Advance, the Sanyo and even the lower-priced entry-level ACT Apricot machines.

The PC jr compatibility gives the machine an added curiousity-value, as it's the first machine released this side of the Atlantic to run a large number of disk-based programs written for IBM's 'home computer'. The only compatibility stumbling block may be the keyboard — with its seven extra keys — but that should be circumnavigated easily with a small configuration routine on programs where its important.

SPECIFICATIONS

System	Tandy 1000
Price	£1,099
Processor	8088 running at 4.77 Mhz
RAM	128K (expandable to 640K)
Screen	80 column × 25 line
Keyboard	90 keys including 12 function
Interface	Parallel printer port, three PC-compatible expansion slots, joystick port, light pen interface, audio output jack, monochrome and colour monitor interfaces.
Operating system	MSDOS 2.11
Software	Deskmate suite, MSDOS and Microsoft GW Basic.
Distributor	Tandy Corporation, Bridge St, Walsall, West Midlands WS1 1LA 0922-648181

FOUL PLAY

Bob Chappell's on the track of murder — or was it suicide? — in Deadline, the latest disk-based adventure from Infocom.

Commodore 64 owners who don't want to miss out on what are probably the greatest adventures, rush out and invest in a disk drive. The justification for this reckless action lies in a single word — Infocom.

For some time now, Commodore has distributed some of the Infocom adventures at just under £12, a price that makes those of us who originally splashed out around £35 per game feel just a tiny bit sick. UK Apple and Atari owners may feel similarly queasy for although all the Infocom range is available to them, the price is still high.

However, an apprentice wizardling has just whispered to me that Commodore may very well soon market the entire Infocom range at this low price — for the 64 and the new Plus 4.

Already out for the 64 at this giveaway price is what I consider to be Infocom's most intelligent text adventure, *Deadline*. If you've never played it, I envy you, for the joys of discovering its many delights are still ahead. *Deadline* makes Melbourne House's *Sherlock* (which is, to be fair, a cassette-based adventure) look as sophisticated as Roland Rat.

Sleuth

An apparent suicide in a room bolted from the inside, a will that was going to be altered and wasn't, and a household with something to hide. You have 12 hours to investigate. The participants are well-rounded characters who conduct realistic conversations with you. They react, speak and behave in different ways depending on their character, your interrogations, the situation, and the stage of the investigation. They continue to live out their lives, even when absent from view. It is this realism that makes *Deadline* so fascinating.

As the detective brought in by the dead man's solicitor to ensure that there has been no foul play, you use a process of exploration, interrogation, deduction and cunning to establish the truth of the matter. It seems to be an open and shut case of suicide and no evidence to indicate homicide. But, if it wasn't a deliberate self-administered drug overdose but murder most foul, whodiddit? And why? And how?

Suspects

Among the cast are a suspicious widow, an aggressive son, a nervous secretary, an arrogant business partner, a gossipy housekeeper and a crusty gardener. You can call on your dependable assistant, Sergeant Duffy, who materialises whenever you need him, like Jeeves. He whisks any substance you care to give him off to the police laboratory for analysis, and reports back later with the results.

You have the run of the house and grounds, and can roam around and interrogate as you like. You know that the will is due to be read in the Living Room at noon. Turn up late and you might miss it or, at the least, earn a stiff rebuke for keeping others waiting. Time passes and various events occur. When, why and how you are at a certain time affects the investigation.

Characters roam the house. You can follow them or stop them in mid-stride to engage them in conversation. As one of the household could be the murderer, there could be some risk involved in confrontations. Similarly, accusing someone of a deed of which they are innocent is also likely to bring wrath down upon your head. Tactful interrogations may evoke different responses than full frontal assaults.

Fact or fictions

The characters, when being questioned, may or may not be telling the truth. Sometimes it may be necessary to gather evidence for a particular statement before making it, to ensure it cannot be refuted (although it may still be capable of explanation). You try to elicit responses from characters by showing them an object — choose the time, place, object and person with care.

You may care to question individuals about other individuals — nothing like a juicy bit of gossip when the trail goes cold. If someone seems a bit uneasy or upset about something, you can ask them what's wrong. You may or may not get a helpful answer. Unorthdox detection may be your forte — if so, you will have no qualms about eavesdropping, hiding or purloining other people's property.

Since time passes only in response to each turn you make, you can elect to wait for a specified time. If something happens while you are waiting, the program gives you an opportunity to stop hanging around and take action. For instance, you might want to follow someone walking by.

Denouement

Eventually, you must decide whether you have gathered enough evidence to arrest someone. Sergeant Duffy steps forward with the handcuffs and carts the accused off to the clink. You are told the outcome of the grand jury investigation and, if a trial results, what the verdict is. If you fail to secure a conviction, your superiors tell you where your case fell down. Should you decide to take the law into your own hands and polish off your prime suspect, do not expect it to go unnoticed (Sergeant Duffy is never far away).

There are many possible endings to an investigation, each depending on how you handle the case and the evidence and conclusions you draw. *Deadline* is a gripping game and makes armchair detection more like real life. After *Deadline* — and it could take weeks to finish — reading a whodunnit is very tame stuff indeed.

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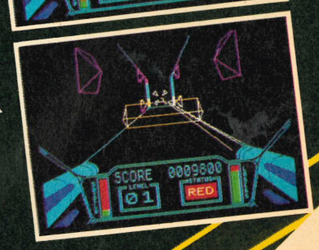

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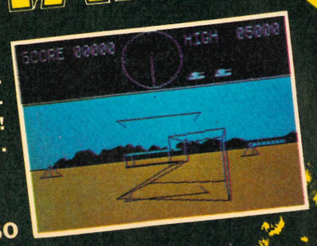

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PERIPHERALS PRO-TEST: DISK INTERFACE

THE SPDOS CONNECTION

John Lettice finds the SPDOS disk interface an attractive option.

A long time ago, in a magazine far, far away (issue 57, to be precise), *PCN* got a chance to preview a prototype disk interface for the Spectrum. Its developers, Dimitri Koveos and Dave Farnborough, who were at that time with Morex, were looking for the necessary funding to get what we felt was an excellent system into production.

Then it all went quiet, and when the Timex drives for the Spectrum came out at the end of last year it looked like Dimitri and Dave had missed the boat.

But after many trials and tribulations the interface has now made it to the marketplace, masterminded by Dave and Dimitri in their new incarnation as Abbeydale Designers and marketed by Watford Electronics. Watford has built up a reputation as a BBC specialist, but in order to fit the SPDOS interface to Watford's BBC disk drives, all you need to do is change the plug.

This means that you can use practically any 3in, 3.5in or 5.25in drive with the system, and depending on which one you choose you can have up to 800K storage on each of four drives.

It also shouldn't be too difficult to connect up any existing drives you may have, provided they have a standard Shugart 34-way interface, as the relevant cables are standard Tandy.

Documentation

The manual supplied is brief, but clear and to the point — SPDOS itself seems considerably easier to use than Masterfile, Omnicalc 2 and Tasword, which come bundled with the system and have their own manuals bound in with the SPDOS manual. But do I spot a desperate attempt to get Sir Clive to adopt SPDOS as the official system?

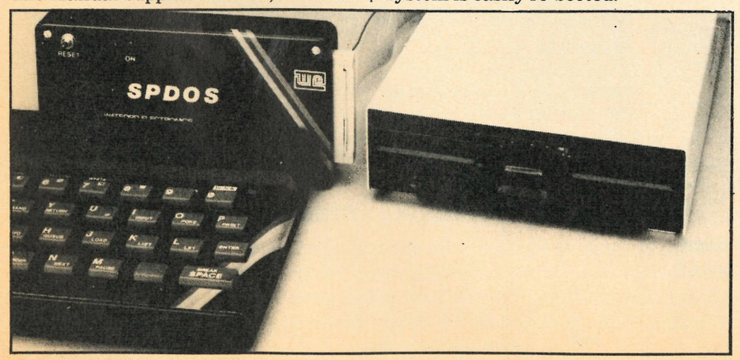
'Sir Clive Sinclair's aspirations and Da Vincian insight into the technological future have contributed a great deal into forming the shape of computing as we know it,' grovels the introduction. Insight I can cope with, but 'Da Vincian'?

For all that, it is a useful piece of work for those — the majority of Spectrum owners — who have no experience of disk systems. It explains what a disk system is in relatively plain English, the setting up instructions are clear and my only minor complaint is that Abbeydale could have made doubly sure the connector was plugged in the right way round by marking one side of it.

The interface itself consists of a black box, flattish in cross-section, with a through edge connector, a reset button and a power-on light. It also has one of these handy little holes so that you have to put the power cable through it to plug it into the Spectrum.

In use

The system boots up automatically when the machine is switched on, taking just over two seconds. This produces an SPDOS copyright message on the screen, and if you get into trouble the system is easily re-booted.



SPDOS plugs in as the usual sit up black box in the back.

As far as fast storage systems for the Spectrum go, the fashion seems to be to use an amended form of the existing Spectrum command system rather than generate a whole new DOS command mode. SPDOS conforms to this trend, rightly in my opinion, and uses the Spectrum and Microdrive commands practically intact, the only difference being that they should be preceded by PRINT # 4. So with a single drive system you load with the command PRINT # 4: LOAD "filename".

If you have more than one drive, it's just a matter of specifying the drive with an additional PRINT statement on the end of the command. MOVE is one of the most useful commands, governing renaming and copying of files.

This can be done singly or it can systematically copy all files from one drive to another. Other notable features are a wildcard facility on ERASE, allowing you to wipe all files within a specific category, and the ability to list sub-directories by incorporating varying strings in filenames.

Abbeydale needs to generate software support for SPDOS, and is therefore building in a fair bit of anti-piracy work in the drives. The MERGE command, for example, has been enhanced so that an attempt to MERGE a program saved to auto-run results in just that — the program auto-runs.

The system disk backup program, COPYSYS, is a particularly good — and, dare I say it, over the top — example of the system's built-in protection. This gives you a menu to follow when you go through during the backup, and woe betide anyone who tries any funny business, as it resets the machine.

Verdict

I'm particularly glad to see this disk system up and running at last. It's fast, easy to use and with the bundled software should be particularly attractive to the surprisingly large Spectrum business user community. In the business field, OCP is currently marketing its Stock Manager program in SPDOS format, and intends to convert more of its output in the near future.

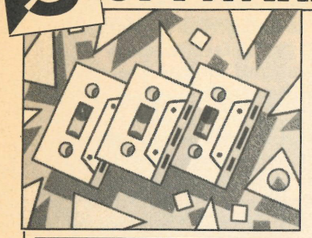
Currently its main rival would seem to be the Timex system, and as a disk system SPDOS is certainly superior, although if the Timex gets better support, this could cancel out any advantage SPDOS has. Viewed in this light, perhaps 'Da Vincian' is the right expression . . .

REPORT CARD: 1 TO 5

Features	●●●●
Documentation	●●●●
Performance	●●●●
Overall value	●●●●

Name SPDOS disk interface **Price** £109 inc VAT **Drives** 200K single £129, 400K single £149, 800K single £175, 1.6Mb twin £339 **Contact** Watford Electronics, Watford 40588/37774.

SOFTWARE PRE-VIEW



We check out the latest contenders on the software market, and cast an eye to the future. Don't forget, if you want your company's package to be included on this page, send your latest releases to Bryan Skinner, *PCN*, 62 Oxford Street, London W1A 2HG, along with prices and 'phone numbers.

AMSTRAD

Amsoft is certainly squeezing the most out of its Roland character. The latest task for the poor hero is solving tricky 3D patterns. The game's rather like *QBert*, except that the only hazard is jumping off a platform into thin air.

Astronomy seems to be enjoying a wave of interest at the moment with programs for the Spectrum and, more notably, the BBC. Amsoft has now released *Star Watcher*. It's pricey, but there are two programs; one develops your knowledge of the subject, the other displays the night sky.

Star Watcher	**£19.95**	**Amsoft 0277-230222**
Square Bashing	**£8.95**	**Amsoft 0277-230222**
Superchess	**£9.95**	**CP Software 0423-57089**

BBC

Castle Quest is undoubtedly one of the best games for the BBC and cries out to be converted (and hopefully extended) for other machines. It's a real arcade adventure, Micro Power has got the blend just right. You control a character, who has to collect items and solve problems, all in a scrolling levels and ladders game. The problems are fiendishly clever.

BBC adventure fans should note *Island of Xaan*, it's a machine code adventure which uses text-compression techniques to get round the Beeb's memory limitations.

Castle Quest	**£12.95**	**Micro Power 0532-458800**
Island Of Xaan	**£7.95**	**Robico 0443-227354**
Beeline	**£5.50**	**Robico 0443-227354**
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Trains	**£7.95**	**Micrograf 0344-81789**
Hacker 2000	**£7.95**	**Micrograf 0344-81789**

COMMODORE 64

Some games programmers have a very odd sense of humour. Combine this with a desire to produce games with some topical theme and you might come up with *Seaside Special*. First help Radium Rodney collect radioactive seaweed from Rotaway Beach, then zoom off to Downing Street to throw it at the evil Polytikians, who resemble some Tory MPs. The game's amusing but the plot's thin.

Combat Leader	**£14.95**	**US Gold 021-359 3020**
Seaside Special	**£6.90**	**Taskset 0262-673798**
Dark Tower	**£7.95**	**Melbourne House 01-940 6064**
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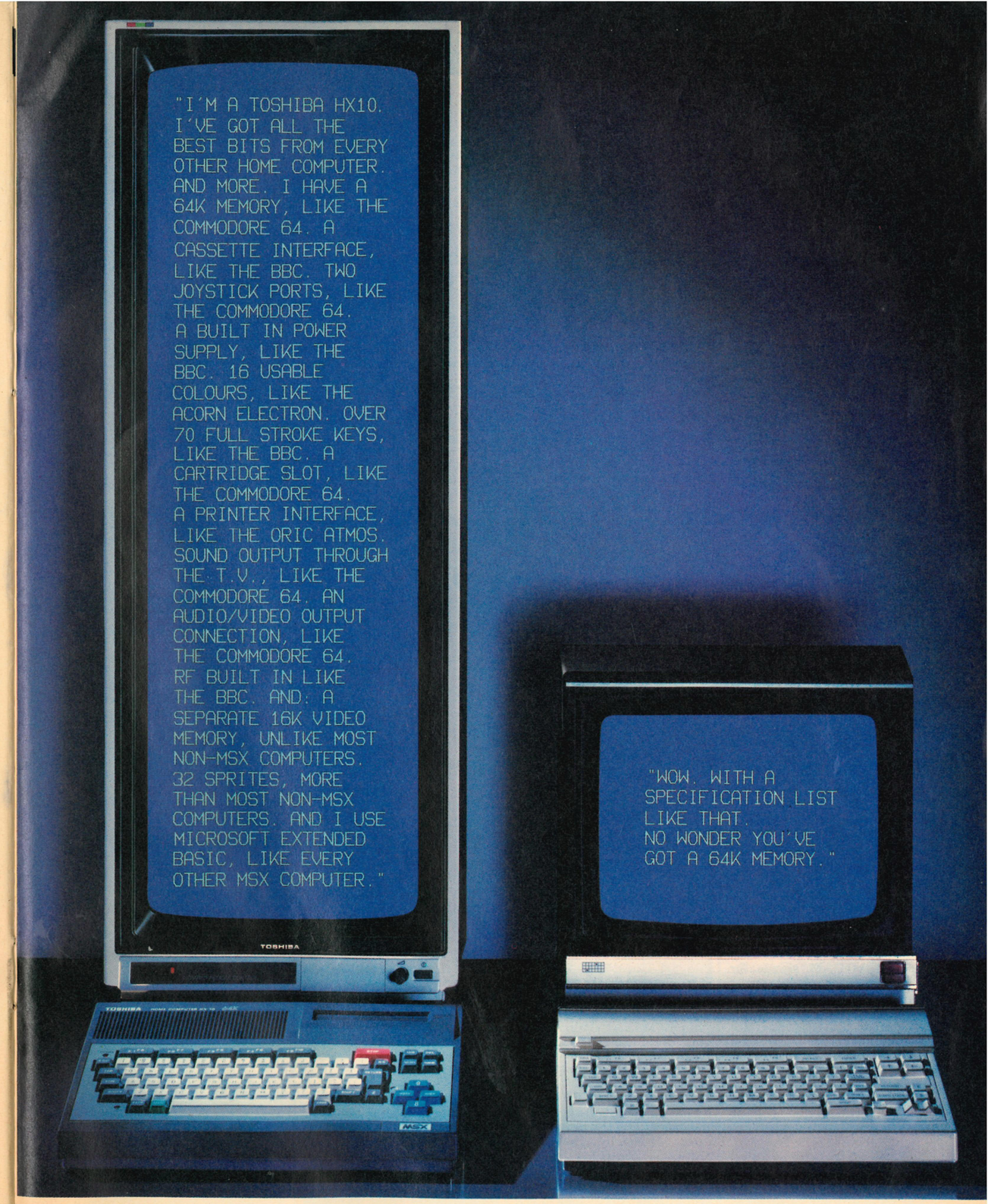

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FOR MORE INFORMATION ON THE TOSHIBA HX10 CONTACT TOSHIBA (UK) LTD., TOSHIBA HOUSE, FRIMLEY ROAD, FRIMLEY, SURREY GU16 5JJ. TEL: (0276) 681691.

GAMEPLAY

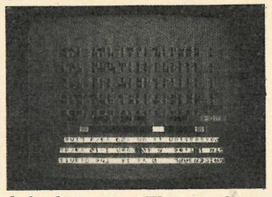
SPECTRUM

QUARTERBACK

Just what the world's been waiting for — a text-only American football simulation! You think I'm exaggerating? Wrong.

A careful reading of the *Quarterback's* cassette cover reveals that nowhere does it actually say you're going to get a graphics-style game, but I'm sure I won't be the only one to be disappointed on discovering that the graphics end with the loading screen. The comprehensive rules for American football are clearly explained on the insert, and when loaded up you can choose a one or two player game and also load a previously saved effort.

The rules are too complicated to go into in detail if you don't know them, but basically you have an attacking team (in possession of the ball) and a



defending team. The attacking team have four attempts, in which they must gain ten yards in order to keep possession. Each attempt will be a particular move, identified by a number, and this is what happens when you see the players in a huddle shouting '7. . . 16. . . 35 . . . yo!' in the middle of the match.

In *Quarterback*, the Offence team can choose from 16 moves, the numbers being listed across the top of a table of potential outcomes. The Defence team have eight possible countermoves, which are listed down the side. Let's assume you're playing against the computer, and you're the Offence team. You press the appropriate number key for the play you want, say, four. The computer will independently choose its defence, let's say it chooses three, and where the two plays meet on the table is indicated by the result.

In this case it would be a gain of two yards for the team with the ball. It might have been three yards lost, eight yards gained, with other options being Interceptions, Fumbles and other features of the American game. A bar across the top indicates how the ball moves backwards and forwards, till one team makes a touchdown.

And basically that's it. There are four quarters to play through, time-outs to be called, and a league table at the end. Exciting, eh?

Aside from a couple of minor bugs, the 'game' is pretty dull, so if you like American football stay tuned to Channel 4, not, Channel 36. **Mike Gerrard**

Rating 3/10
Price £5.95
Publisher NAB Software, 7, Oakwood Drive, Aspley, Notts.

COMMODORE 64

1985

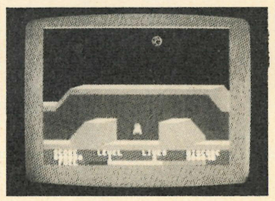
Despite the strangely irrelevant title, this game turns out to be nothing more than a very competent variant of the classic *Lunar Lander* format that we know so well.

The dotty scenario tells you that it is the day after Big Brother has been destroyed (hence the title), and the Earth must survive on its own. You have been assigned to fly a small spacecraft to collect much-needed energy (nuclear plasma pods) from four neighbouring planets.

Your transport turns out to be one of those old lunar landing craft — you know, one of those where you can rotate clockwise and anticlockwise, and can fire thruster rockets.

You begin by piloting your ship out its space station, no mean feat in itself. Once free from Earth, you can move your ship to any of the four planets that sit obligingly in a row near the top of the screen. Mind out for the flying saucer.

A different screen pops up for each of the planets entered. Each planet has a set of obstacles, missiles and tunnels around which you must man-



oeuvre your craft, setting down gently and precisely on a nuclear pod. Should you succeed at each planet, you then get the dubious reward of entering a twisting cavern where you must collect a fusion core.

The game has simple but effective and colourful graphics, a good selection of appropriate sounds, and a fairly testing challenge. At such a low price, this entertaining little program is a bargain. **Bob Chappell**

Rating 8/10
Price £1.99
Publisher Mastertronics 01-402 3316

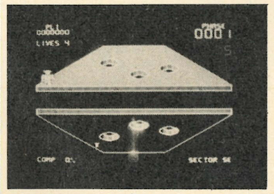
COMMODORE 64

CADCAM WARRIOR

Here's another of those long-winded action exploration games with thousands of different screens — in this case 8,192. However, this one does at least have a couple of novel and attractive touches.

The accompanying scenario puts you up against an innovative but faulty design machine being exhibited at an industry show. CAD/CAM stands for computer-aided design and computer-aided manufacture.

The machine's first demonstration is to design and produce a simple chair — instead of which it comes up with a flat metal plate with drilled mount-



also has a dark underside. By jumping through the drill holes your droid can battle on both sides of each plate. Naturally, on the underside your droid seems to hang upside down, making the perspective extra troublesome.

ing holes. Your task is to use the small white droid incarcerated in the system to find and repair the memory bank containing the 'human needs' factor.

Each of *Cadcam Warrior's* screens shows a shiny three-dimensional plate design which

Once you've got the hang of zapping your adversaries — a variety of flat and three-dimensional shapes, rivets, fireballs and so on — you'll find that progress requires quite a lot of thought.

Shooting everything in sight is enough to get through phase one, but following screens set other tasks, such as collecting objects. You'll need to crack the colour code of each plate to understand the rules for clearing that screen.

When you've finished a screen there is a choice of directions. To make good progress you'll have to find access to information about the required passwords and conditions of entry to certain areas. You'll also have to make a map. It's not necessary to work through all 3,192 screens to reach the final challenge, but you'll need a lot of grey matter to take the right short cuts from plate to plate.

Two misgivings. The computer industry story which sets the scene is likely to turn off as many people as it will charm — and the perspective graphics mean that trying to zap things enough game and sufficiently-different from the crowd to be worth playing. **Nigel Lowry**

Rating 8/10
Price £9.95
Publisher Task Set
0262-673788

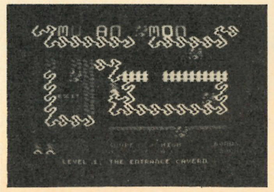
AMSTRAD

MUTANT MONTY

Monty's a fairly ordinary guy, who wants to be rich and famous just like anybody else. The fame aim can be achieved by rescuing yet another damsel in distress, riches arriving in the form of gold scattered about the various screens he has to get through to reach her.

Each screen has a number of gold blocks, and only when Monty has picked up all these by passing through them does the doorway to the next screen open. Naturally there are obstacles, these being the usual variety of beasties that patrol up and down, left and right in set patterns. Monty nips in and out, hiding in little niches, or following the patrolling meanies and having to skip out of the way at the very last second into a hidey-hole.

The manouvering is tricky enough, made worse by Monty's

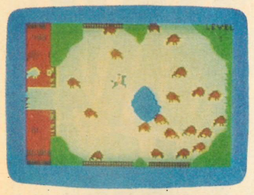


keenness to get in the direction he's going — in other words he won't stand still, and just keeps travelling till you change his direction by keyboard or joystick. For that reason I didn't find it the easiest of games to play, but three cheers for the keyboard layout of Q/A/O/P for Up/Down/Left/Right.

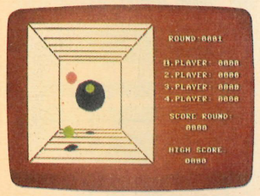
Graphics and sound are good, and *Mutant Monty* holds its own with most of the Amstrad software that's around. **Mike Gerrard**

Rating 7/10
Price £8.95
Publisher Amsoft, 0277-230222

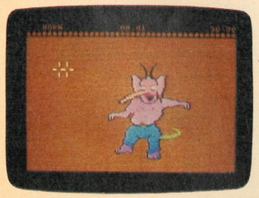
DRIVE A HARD SOFT BARGAIN.



'Buffalo Round Up'

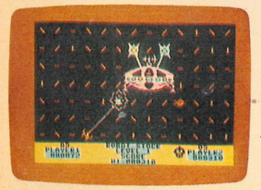


'Spatial Billiards'



'Dancing Monster'

'Save Me Brave Knight'



'Photon Reflection'

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Then you can don your shining armour and rescue your true love from her evil captors' castle. 'Save Me Brave Knight' is full of evil monsters and fire-breathing dragons, and is exceptional in its graphic style.

If that sounds a little down-to-earth, how about 'Photon Reflection,' where aliens make the final assault on your galaxy. As the Supreme Commander you must capture their Mother Ship. It's a strategically demanding game with a unique laser-shooting sequence using reflectors. Tricky!

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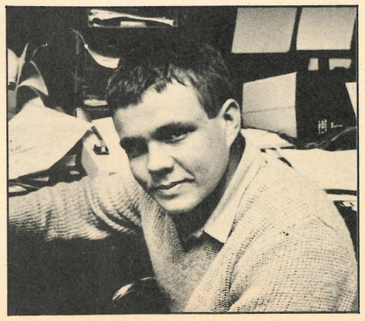

The man behind *YS MegaBasic* — Mike Leaman.

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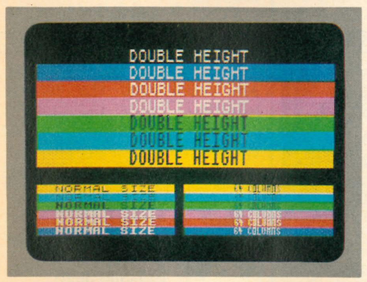
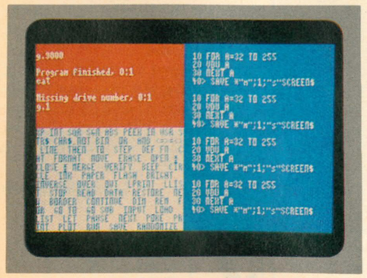
Included in the *YS MegaBasic* package, you'll find a special utility program called *Sprite Designer.* Written by Mike Leaman in *YS MegaBasic*, this 11K program is designed to help you create sprites on the Spectrum.

You can have up to ten sprites on-screen at any one time, but if you're careful with memory you can get more!



Here, *YS MegaBasic* is showing off its multifarious character sizes and fonts. Each window contains text in three different sizes: double height, normal height and that used for 64-columns; double height and standard text can be output in three different fonts.



The screen format for the input/output of *YS MegaBasic*. Three windows are provided for input, LISTing and RUNning programs; under software control, each window's size and purpose can be changed to suit individual requirements.

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GAMEPLAY

COMMODORE 64

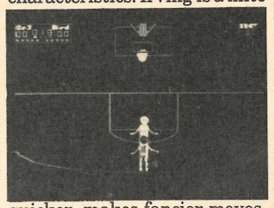
ONE-ON-ONE

STAR GAME

Basketball fans should love this simulation of the game — it's a cracker. *One-On-One* soon reached the number two spot in the US charts and when you play it, you'll see why. It has some of the most lifelike animation ever seen in a sports game. These players move, dribble and jump like the real thing.

The game features just two players, hence the title, both shooting into the same basket. Who starts off with the ball after a basket depends on the option selected. The animated characters are named after and modelled on two of the best US basketball players — Larry Bird and Julius Irving.

Each has different playing characteristics. Irving is a mite



quicker, makes fancier moves, stretches higher and hangs in the air longer. Larry Bird is bigger and stronger, plays the rebounds better and is more skilful at long shots. These qualities are faithfully reflected.

You can take charge of one player while the computer controls the other: naturally, the computer's play is dazzling. There is also a two-player option.

Control couldn't be simpler, yet the manoeuvres and combination movements you can coax from the players are stunning. To see your player spin 180 degrees, dribble past the defender and shoot close in gives a vicarious thrill quite unmatched in any other sports simulation I've seen. You might be the world's worst basketball player, but the two characters are programmed to be brilliant. Boy, does it make you feel good to hurl in a long distance shot from a tight angle and see it sail, sweet as a nut, smack into the basket.

To add to the fun, there is a random replay sequence, a choice of skill levels (the oddball of a referee tends to be fast asleep on the lower ones), some humourous incidents (watch out for the shattering backboard), play up to 21 points or to a fixed time (split into quarters) and selection of who is to have possession after a basket is scored.

All this adds up to one heck of a great game. The animation alone is out of this world. Dribble down to your shop and buy it — you won't regret it.

Bob Chappell

Price £9.95 cassette, £11.95 disk
Publisher Ariolasoft 01-834 8507

COMMODORE 64

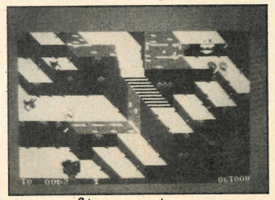
CONGO BONGO

Sega should have left this official adaptation from the arcade game where it was. This version for the Commodore 64 certainly didn't bang my drum.

All you get for just under a tenner is two screens. The first shows an attractive enough series of 3D stepped plateaux, separated by rivers, stairs and a slide. The idea is to navigate your way to the highest plateau where Congo, a passive gorilla, perches.

The only hazards are falling coconuts and prancing monkeys. It should take you all of ten seconds to conquer this screen on level 1. When you reach Congo, the picture slides upwards to reveal the second and final screen.

So far, so boring. The next one's hardly any better — it's a Frogger look-alike. You must cross the river by jumping onto the hippos, lilypads and fish. On the far side, the only other danger is a rampaging rhino. The difficulty of this second screen contrasted sharply with the simplicity of the first. Try as I might, my little White Hunter always turned into an angel if he so much as nudged one of the



means of transport.

Should you have the patience, persistence or masochism to reach the far bank, it's then back to screen 1 again with an increase in the number of hazards.

Congo Bongo failed to excite. The graphics are nothing to write home about, the sound effects, given the 64's power, are crude, and the content minimal.

Better to let this sleeping arcade game lie is my advice.

Bob Chappell

Rating 5/10
Price £9.95 **Publisher** US Gold
021-359 3020

AMSTRAD

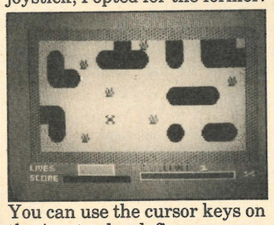
SPLAT

You have three chances to avoid being plastered against the wall in this game. You must guide Zippy round a massive exploration area which slides about unpredictably.

The aim of the game is to get Zippy through eight levels, avoiding numerous obstacles put in his path. To get through the levels Zippy must eat as much grass and plums as possible while dodging painful drawing pins and pools of water.

After the preliminary title screens the option screen flips up. You can change the background and foreground colours by pressing DEL — there's a choice of six colours.

You can select keyboard or joystick; I opted for the former.



You can use the cursor keys on the Amstrad or define your own keys. Completing each level wins you a bonus point. So, with three lives to play around with I set Zippy on his rampage to complete his mission.

Performance on my first attempt was pretty abysmal. As well as good coordination with the keys, you need to keep your eyes glued to the screen to see which way it's scrolling.

Zippy scampers around in a butterfly stroke fashion, sounding like some sort of fly eating blades of grass. At the same time the screen scrolls up, down, left and right in a bid to squash him.

At the bottom of the screen you can see the number of lives left, your score, and how far on that particular level you've reached — which tends to act more as a reminder of how poorly you're doing.

The graphics, colours and scrolling movement are pretty well done. It is annoying, though, that every time you lose three lives you must go through the boring options etc before you can get stuck in to another game.

I managed to reach level 2 with a score of 535 — but if this is a taste of what's in store for you on the other six levels, you'll certainly get some hectic fun out of this game.

Sandra Grandison

Rating 7/10
Price £8.95
Publisher Amsoft
0277-230222

SPECTRUM

BRIAN BLOODAXE

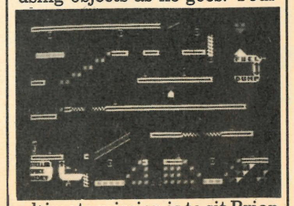
Britain is under attack, not from hordes of aliens from outer space but from viking Brian Bloodaxe. Although a platform game, it contains enough variations and nuances to tickle the most jaded palate.

For starters, there's the opening tune — Sousa's stirring *Liberty Bell* (Monty Python theme tune). If you have one, make sure you hook up a Currah Speech box to get the full benefit of the sound.

Brian lopes and leaps, with a horned helmet and axe, the helmet being especially useful for sticking into ceilings and foes alike. There are a daunting 104 screens for Brian to conquer, each with a set of logical puzzles, as well as 300 enemies, weapons and surprises and an abundance of hidden traps.

Among the zany antagonists Brian encounters are bishops, pints of lager, sharks, ducks, sea monsters, toilets, boots, flying scissors, knights in armour, and rhinoceri.

Each screen supposedly represents a British town — part of the fun is guessing which they're supposed to be. Brian explores towns, collecting and using objects as he goes. Your



ultimate mission is to sit Brian on the throne after amassing the Crown Jewels. That done, the game sets another task. Complete it and a prize is on offer — your choice of one of the three objects Brian is carrying at the finale.

For its graphics, humour and huge variety of screens and puzzles, the game deserves a warm welcome. For all it's similarity of theme, *Brian Bloodaxe* looks set to rival *Manic Miner* and *Jet Set Willy*.

Bob Chappell

Rating 8/10
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IT'S ALL GO

Go play it, says Colin Cohen.

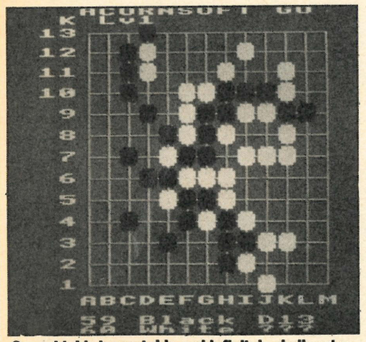
Japan's national board game *Go* has, over 4,000 years, acquired immense popularity in the Far East, and some game experts categorise it as the world's greatest strategic game, far surpassing chess in scope.

Examination of the operating system chips in MSX machines will probably reveal routines for this complex game in ROM, but in the meantime you'll have to make do with one of the two British versions on the market: Acornsoft's *Go* (based on the program which won the company's 1984 *Go* competition), and *Microgo* from Edge Computers.

Before looking at these two games in detail, let's outline some of the general principles behind the game.

Principles of Go

Go is, as one might expect, highly inscrutable. There's a simple-looking grid, black and white pieces (called stones) and it looks as if any clot can play it; however, any clot will soon find that this game's one for the addict, and that while the available moves seem very simple, the possible combinations and



Go — highly inscrutable and infinitely challenging.

scope for strategic play, are all but infinite.

The idea is for you or the computer to place a black or white stone on the board so as to 'capture' as large an area as possible. You should also try to capture as many of your opponent's pieces as you can. You may not get points for these captures, and your opponent is in no danger of running out of pieces, but at least getting them off the board leaves you more room for manouevre and mayhem. Curiously, there should only be 181 pieces, but both versions give you an unlimited supply.

An idea of the game's complexity is given by the fact that although Acornsoft's board only has 169 positions, it takes three-and-a-half hours for the computer to play itself to a standstill in about 150 moves.

Features

The two implementations are about as different as possible, given that each starts off with a board divided into a grid: Acornsoft's is 13 × 13, Edge's 9 × 9. The graphics used in Edge Computer's *Microgo* look much better on a colour monitor, and the program includes some rather superfluous sound effects. A proper *Go* board is a 19 × 19 grid, and has nine 'star' points on it — missing from both versions.

In neither version is there a save option, and in view of the fact that a game can be a very protracted affair, this detracts badly from their appeal. It would be especially useful to the novice using Acornsoft's version, which lets you unravel moves right back to the start if things go badly.

As it is, Acornsoft's backtracking is a great help to the beginner. On the other hand, if you're not watching *Microgo* very closely, it's quite possible to miss the computer's move, forget what you did yourself, and be left high and dry.

For the beginner, Edge's version probably has the edge. Although there's no printed documentation other than a card giving the seven control keys and details of the skill levels (omitting the four vital cursor keys), there's the facility to run a demonstration program in which the computer plays itself.

The explanations are clear, except when it comes to scoring (*ie* the difference between Japanese and Chinese methods), and why certain areas of the board cannot be used. A demo game takes about eight minutes and 64 moves, but lacks Acornsoft's 'thinking' mode. This allows you to see the computer display every possible move for black or white to the end of the game as it calculates the next move.

Microgo's other main advantage is its display. Using the smaller board makes it rather easier to accommodate a side display for captured stones, so its easier to understand sudden gaps in the game when you see the growing pile.

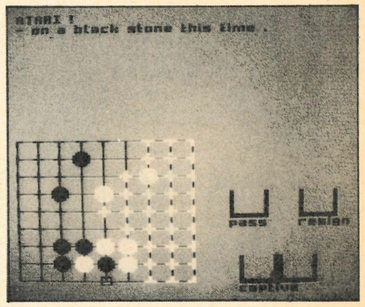
Acornsoft's *Go* has two levels of skill and ten levels of computer handicap (you get from 0 to 9 moves head start), while *Microgo* effectively combines these to give five levels. Both versions permit player vs player, player vs computer, and computer vs computer, and *Microgo* allows you to play as black or white.

Both versions use the four cursor keys to move pieces: Acornsoft's flashes the last-moved piece and that becomes the cursor's home position (making it very easy to go to an adjacent position, and you can use a joystick); *Microgo* positions the next piece at the side of the board and slides it smoothly to the chosen position.

Neither version allows you to fix a stone in an illegal position, though it's not always clear quite why your choice isn't allowed. In both, the Atari warning flashes when you make a hazardous move, and is removed on the next turn, though this doesn't necessarily mean that the danger's passed.

Verdict

For the beginner, Edge's *Microgo* is better, largely because of its smaller grid and its tally of captured pieces; however, Acornsoft's *Go* is better for the more



Microgo — demonstrating the game for beginners.

experienced player, with its larger grid and greater choice of controls.

Both versions are crash-proof, highly sophisticated, and will keep you either spellbound or bored rigid, depending on your attitude to moving black and white pieces about on a board.

Finally, remember that *Microgo*'s graphics are a bit too good for an average TV, and that it's only available on cassette (though a disk version is planned).

REPORT CARD: 1 TO 5

Features	●●●●
Documentation	●●●●
Performance	●●●
Overall value	●●●●

Name Go **Price** £9.95 **Publisher** Acornsoft 0223-316039 **Format** Cassette/Disk **Other versions** none.

REPORT CARD: 1 TO 5

Features	●●●
Documentation	●
Performance	●●●
Overall value	●●●●

Name Microgo 1 **Price** £9.95 **Publisher** Edge Computers 0734-65852 **Format** Cassette **Other versions** Commodore 64

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SMITH CORONA	TP1 12cps	£154.00
TEC	STARWRITER F1040 40cps	£895.00
TEC	STARWRITER F5055 55cps	£1235.00
TEC	Sheetfeeder	£459.00
TEC	Tractor	£138.00

CIFER	T4	£760.00
HAZELTINE	ESPRIT Fixed Keyboard	£395.00
QUME	QVT 103 (VT100 VT131)	£695.00
TELEVIDEO	910	£489.00

AST, HERCULES, QUADRAM, SIMONS ALL AT BIG SAVINGS — POA

Oric's unrivalled reputation for excellence and technical innovation is alive and well, even as the company searches for a rescuer.

Our picture shows (oh yes it does, look closer) the latest earth-shattering product from the stable that spawned the Atmos. You may argue that stables don't spawn, but that just shows how innovative a company Oric is.

That Funny Looking Bit Of Plastic (FLBOP) stalking the lower Atmos is no ordinary FLBOP — it is actually 'a protective cover to the expansion bus on the Oric 1 and Atmos.'

In effect, it's one of those little gizmos specially designed to be taken off by owners and lost the first time they want to use the machine. The one on the QL and the eyepiece protector on a camera are good examples.

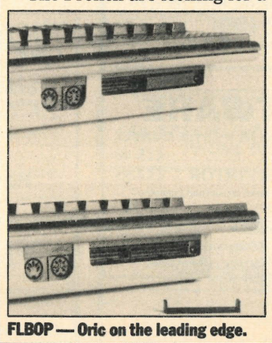
So Oric owners who pine because they don't have their very own bit of plastic to lose need pine no longer — just send an sae to Tansoft, Techno Park, Newmarket Road, Cambridge and they'll post you one absolutely free. Tansoft is still in business.

Over in France, where one of the late Oric's brightest stars still shines, plans are afoot to transform society. 'France will be one of the leading countries in the world, perhaps the leading one, in teaching everyone how to use computers,' says Prime Minister Laurent Fabius boldly.

Needless to say, it's going to take a lot of microcomputers to turn all those inefficient peasant farmers, curled conquistadors and smoothy singers into computer whizz-kids, so 120,000 machines will be installed in schools and universities by the autumn.

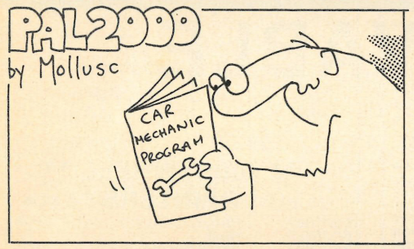
Unfortunately, Oric France doesn't look likely to pick up this order.

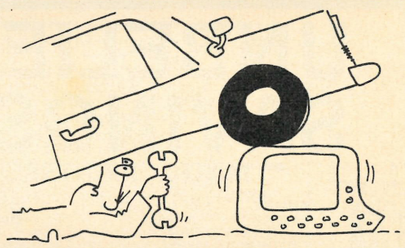
The French are looking for a native micro manufacturer, to boost their own industry. Their main problem will be finding one.



FLBOP — Oric on the leading edge.

Anybody who saw the Colin Jones/Don Curry fight a month back will remember the scenes at the end, when disgruntled fans threw beer cans into the ring. Now it looks as though they're clubbing together and throwing filing cabinets in there as well. This kind of thing must be stamped out before somebody gets killed (if they manage to survive the fight, that is). But come rain, shine or filing cabinets you can rely on genial Harry Carpenter being there to interview the last man left standing; here he is beaming from ear to ear, probably at the thought of the cheque he'll get for simply leaning on a piece of office equipment and being photographed.





SYNTAX ERRORS

Issue 97's Software Preview page mentioned a new CRL program which we baptised High Flyer. You'll look long, hard and in vain for such a program on the shelves of your local store — its real title is Glider Pilot. The writer responsible has been pushed off his thermal.

Further back in time, issue 93 in this case, we published an artistic Amstrad program in which all the £ signs in the listing should be hashes (usually Shift/3).

We had a few crossed wires in our Routine Enquiry on Spectrum disk drives last week. The disk drive referred to was originally reviewed as a prototype in *PCN* last year, except it was an interface. It was then being sold by Morex, but the designers have since left the company, taking the interface with them, and it's now being sold by Watford Electronics. See page 29 for a full review.

NEXT WEEK

Amstrad Assembled
A tale of two assemblers — we compare the traditional Zen with the more recent Arnor product in the software section.

Aha! Yamaha
Nothing to do with motorcycles or even electronic cars, the CX-5 is Yamaha's entrant in the MSX stakes. With Yamaha's background in musical instruments, it's sure to put a new gloss on the word 'keyboard'.

PCN DATELINES

Event	Dates	Venue	Organisers
Intl trade show — LET	Feb 17-19	Olympia, London	Turret-Wheatland, 0923-777000
Intl Computer Graphics User Show and Conference	Feb 19-21	Barbican, London	Mountbuild, 01-486 1951
MEXCOM	Feb 25-28	Mexico City, Mexico	AESI Ltd, 01-379 7628
PC Trade Show	Feb 26-28	Barbican, London	EMAP Intl. Exhibitions, 01-837 3699
Dauntsey's School Educational Software Fair	March 1-2	Dauntsey's School, W Lavington, Devizes, Wilts	Peter Harris, 038 081 2289-2325
Computer Conference and Exhibition — INTERFACE	March 4-7	Atlanta, USA	Interface Group, 300 First Avenue, Needham, Mass 02194 (617) 4496600
DEXPO Europe, 1985	March 6-8	Olympia 2, London	CGP 01-582 9256
Scottish Computer Show & Conference	March 12-14	Anderston Centre, Glasgow	Cahners Exhibitions, 01-891 5051
Personal Computer Show	March 13-16	Sydney, Australia	OES 01-486 1951
Personal Computer Show	March 21-24	Amsterdam, Holland	RAI Gebouw BV, Europaplein 2, 1078 GZ Amsterdam
COMDEX/WINTER	March 21-24	Anaheim, USA	Interface Group, 300 First Avenue, Needham, Mass 02194 (617) 4496600

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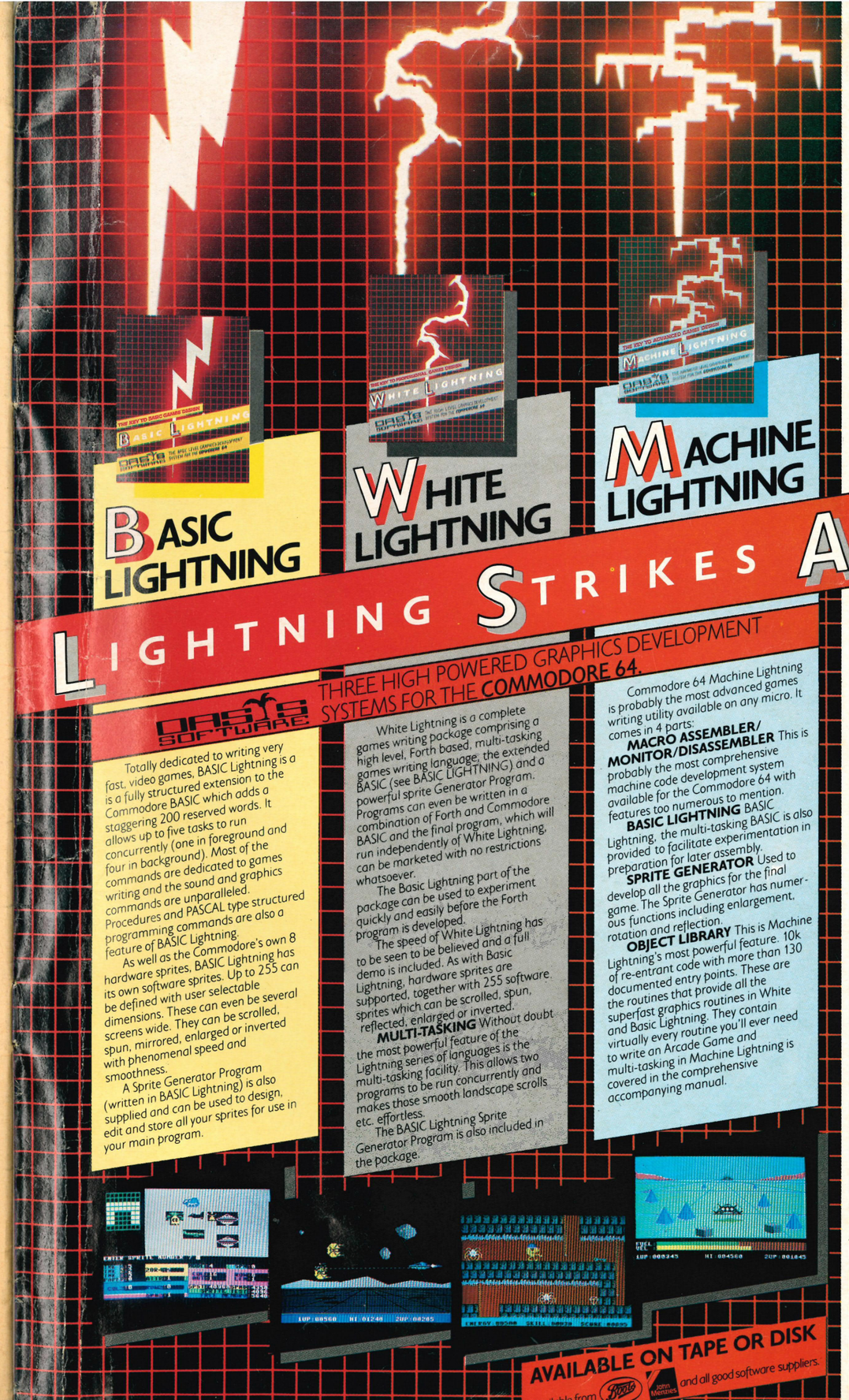

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